

University-affiliated Spaceport Technology Development Contract NAS1003006

100747

TASK ORDER

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TO Ref.	Task Order No.	Contract Year	Task Order Revision	Reference Plan Revision	Laboratory/Area	Type:
SPI	00335	7	C	C	Launch Equipment Test Facility	Project

Title:

LETF Constellation Program Support

Director Area	R&D:	Manager Group	Period of Performance:
Systems & Project Engineering	No	Project Engineering	From: 03/06/2006
	Scope Change: Yes		To: 10/31/2009

Note: Target Costs change only if scope changes

CY1 to CY5
(K\$)

CY6
(K\$)

Contract Year 7 (CY7) Cost Targets

CY8
(K\$)

OUTYEARS
(K\$)

TOTAL
(K\$)

TOTAL ADJUST TARGET LABOR COSTS

ESTIMATED OTHER DIRECT COSTS

SUBTOTAL TOTAL ESTIMATED COSTS

AWARD FEE (on labor only)

INCENTIVE FEE (on labor only)

TOTAL COST AND FEE

7,301.24

11,027.49

\$5,570,178

\$526,000

\$6,096,178

225.00

0.00

24,649.91

FS	PROGRAM	FUND CODE	\$ FROM	\$ DELTA	\$ TO	INITIALS
1	CONSTL	321379.09.01.01.11	\$182,840.00	\$0.00	\$182,840.00	
2	CONSTL	321379.09.01.01.11	\$238,868.00	\$0.00	\$238,868.00	
3	CONSTL	321379.09.01.01.11	\$593,886.00	\$0.00	\$593,886.00	
4	CONSTL	321379.09.01.01.11	\$574,407.00	\$0.00	\$574,407.00	
5	CONSTL	321379.09.01.01.11	\$566,922.00	\$0.00	\$566,922.00	
6	CONSTL	321379.09.01.01.11	\$57,079.00	\$0.00	\$57,079.00	
7	CONSTL	321379.09.01.01.11	\$91,735.00	\$0.00	\$91,735.00	
8	CONSTL	321379.09.01.01.11	\$1,227,286.00	\$0.00	\$1,227,286.00	
9	CONSTL	321379.09.01.01.11	\$34,906.00	\$0.00	\$34,906.00	
10	CONSTL	321379.09.01.01.11	\$559,723.00	\$0.00	\$559,723.00	
11	CONSTL	321379.09.01.01.11	\$71,077.00	\$0.00	\$71,077.00	
12	SAFETY	843515.01.15.06	\$330,000.00	\$0.00	\$330,000.00	
13	CONSTL	292360.09.24.04.04	\$803,000.00	\$0.00	\$803,000.00	
14	CONSTL	292360.09.24.04.04	\$394,000.00	\$0.00	\$394,000.00	
15	CONSTL	292360.09.24.04.04	\$6,184,218.00	\$0.00	\$6,184,218.00	
16	CONSTL	292360.09.24.04.04	\$2,592,400.00	\$0.00	\$2,592,400.00	
17	CONSTL	292360.09.24.04.04	\$5,000.00	\$0.00	\$5,000.00	
18	CONSTL	292360.09.24.04.04	\$2,503,669.00	\$0.00	\$2,503,669.00	
19	CONSTL	292360.09.24.04.04	\$104,000.00	\$0.00	\$104,000.00	
20	CONSTL	321379.09.01.05.01.11	\$1,309,031.00	\$0.00	\$1,309,031.00	
TOTAL CUMULATIVE FUND LIMIT (NOT TO EXCEED)			\$24,023,437.00	\$526,000.00	\$24,549,437.00	

NASA TASK ORDER MANAGER/ ORG / PHONE

SIGNATURE Eric Ernst / NE-D1 / (321)867-2732

DATE

CUSTOMER TECH REP(OPTIONAL)/ ORG / PHONE

DATE

CERTIFICATION OF FUNDING/ ORG / PHONE

SIGNATURE Carol Davis / GG-C-A2 / (321)867-5942

DATE

CONTRACT TECHNICAL MANAGER/ ORG / PHONE

DATE

CONTRACT OFFICER/ ORG / PHONE

SIGNATURE Joyce McDowell / OP-ES / (321)867-3437

DATE

ACCEPTANCE ACKNOWLEDGEMENT BY CONTRACTOR/ ORG / PHONE

DATE

SIGNATURE Martin Cummins / USTDC / (321)867-5408

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NSV 31912009

1841; 1842; 1843; 1844; 1845; 1846; 1847; 1848; 1849; 1850; 1851; 1852; 1853; 1854; 1855; 1856; 1857; 1858; 1859; 1860; 1861; 1862; 1863; 1864; 1865; 1866; 1867; 1868; 1869; 1870; 1871; 1872; 1873; 1874; 1875; 1876; 1877; 1878; 1879; 1880; 1881; 1882; 1883; 1884; 1885; 1886; 1887; 1888; 1889; 1890; 1891; 1892; 1893; 1894; 1895; 1896; 1897; 1898; 1899; 1900; 1901; 1902; 1903; 1904; 1905; 1906; 1907; 1908; 1909; 1910; 1911; 1912; 1913; 1914; 1915; 1916; 1917; 1918; 1919; 1920; 1921; 1922; 1923; 1924; 1925; 1926; 1927; 1928; 1929; 1930; 1931; 1932; 1933; 1934; 1935; 1936; 1937; 1938; 1939; 1940; 1941; 1942; 1943; 1944; 1945; 1946; 1947; 1948; 1949; 1950; 1951; 1952; 1953; 1954; 1955; 1956; 1957; 1958; 1959; 1960; 1961; 1962; 1963; 1964; 1965; 1966; 1967; 1968; 1969; 1970; 1971; 1972; 1973; 1974; 1975; 1976; 1977; 1978; 1979; 1980; 1981; 1982; 1983; 1984; 1985; 1986; 1987; 1988; 1989; 1990; 1991; 1992; 1993; 1994; 1995; 1996; 1997; 1998; 1999; 2000; 2001; 2002; 2003; 2004; 2005; 2006; 2007; 2008; 2009; 2010; 2011; 2012; 2013; 2014; 2015; 2016; 2017; 2018; 2019; 2020; 2021; 2022; 2023; 2024; 2025; 2026; 2027; 2028; 2029; 2030; 2031; 2032; 2033; 2034; 2035; 2036; 2037; 2038; 2039; 2040; 2041; 2042; 2043; 2044; 2045; 2046; 2047; 2048; 2049; 2050; 2051; 2052; 2053; 2054; 2055; 2056; 2057; 2058; 2059; 2060; 2061; 2062; 2063; 2064; 2065; 2066; 2067; 2068; 2069; 2070; 2071; 2072; 2073; 2074; 2075; 2076; 2077; 2078; 2079; 2080; 2081; 2082; 2083; 2084; 2085; 2086; 2087; 2088; 2089; 2090; 2091; 2092; 2093; 2094; 2095; 2096; 2097; 2098; 2099; 2100; 2101; 2102; 2103; 2104; 2105; 2106; 2107; 2108; 2109; 2110; 2111; 2112; 2113; 2114; 2115; 2116; 2117; 2118; 2119; 2120; 2121; 2122; 2123; 2124; 2125; 2126; 2127; 2128; 2129; 2130; 2131; 2132; 2133; 2134; 2135; 2136; 2137; 2138; 2139; 2140; 2141; 2142; 2143; 2144; 2145; 2146; 2147; 2148; 2149; 2150; 2151; 2152; 2153; 2154; 2155; 2156; 2157; 2158; 2159; 2160; 2161; 2162; 2163; 2164; 2165; 2166; 2167; 2168; 2169; 2170; 2171; 2172; 2173; 2174; 2175; 2176; 2177; 2178; 2179; 2180; 2181; 2182; 2183; 2184; 2185; 2186; 2187; 2188; 2189; 2190; 2191; 2192; 2193; 2194; 2195; 2196; 2197; 2198; 2199; 2200; 2201; 2202; 2203; 2204; 2205; 2206; 2207; 2208; 2209; 2210; 2211; 2212; 2213; 2214; 2215; 2216; 2217; 2218; 2219; 2220; 2221; 2222; 2223; 2224; 2225; 2226; 2227; 2228; 2229; 2230; 2231; 2232; 2233; 2234; 2235; 2236; 2237; 2238; 2239; 2240; 2241; 2242; 2243; 2244; 2245; 2246; 2247; 2248; 2249; 2250; 2251; 2252; 2253; 2254; 2255; 2256; 2257; 2258; 2259; 2260; 2261; 2262; 2263; 2264; 2265; 2266; 2267; 2268; 2269; 2270; 2271; 2272; 2273; 2274; 2275; 2276; 2277; 2278; 2279; 2280; 2281; 2282; 2283; 2284; 2285; 2286; 2287; 2288; 2289; 2290; 2291; 2292; 2293; 2294; 2295; 2296; 2297; 2298; 2299; 2300; 2301; 2302; 2303; 2304; 2305; 2306; 2307; 2308; 2309; 2310; 2311; 2312; 2313; 2314; 2315; 2316; 2317; 2318; 2319; 2320; 2321; 2322; 2323; 2324; 2325; 2326; 2327; 2328; 2329; 2330; 2331; 2332; 2333; 2334; 2335; 2336; 2337; 2338; 2339; 2340; 2341; 2342; 2343; 2344; 2345; 2346; 2347; 2348; 2349; 2350; 2351; 2352; 2353; 2354; 2355; 2356; 2357; 2358; 2359; 2360; 2361; 2362; 2363; 2364; 2365; 2366; 2367; 2368; 2369; 2370; 2371; 2372; 2373; 2374; 2375; 2376; 2377; 2378; 2379; 2380; 2381; 2382; 2383; 2384; 2385; 2386; 2387; 2388; 2389; 2390; 2391; 2392; 2393; 2394; 2395; 2396; 2397; 2398; 2399; 2400; 2401; 2402; 2403; 2404; 2405; 2406; 2407; 2408; 2409; 2410; 2411; 2412; 2413; 2414; 2415; 2416; 2417; 2418; 2419; 2420; 2421; 2422; 2423; 2424; 2425; 2426; 2427; 2428; 2429; 2430; 2431; 2432; 2433; 2434; 2435; 2436; 2437; 2438; 2439; 2440; 2441; 2442; 2443; 2444; 2445; 2446; 2447; 2448; 2449; 2450; 2451; 2452; 2453; 2454; 2455; 2456; 2457; 2458; 2459; 2460; 2461; 2462; 2463; 2464; 2465; 2466; 2467; 2468; 2469; 2470; 2471; 2472; 2473; 2474; 2475; 2476; 2477; 2478; 2479; 2480; 2481; 2482; 2483; 2484; 2485; 2486; 2487; 2488; 2489; 2490; 2491; 2492; 2493; 2494; 2495; 2496; 2497; 2498; 2499; 2500; 2501; 2502; 2503; 2504; 2505; 2506; 2507; 2508; 2509; 2510; 2511; 2512; 2513; 2514; 2515; 2516; 2517; 2518; 2519; 2520; 2521; 2522; 25

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A. PROJECT DESCRIPTION & SCOPE

Revision C: Task Order Revision C is generated in response to Task Order Plan Revision C.

The purpose of this Revision is to add scope to perform the Vehicle Motion Simulator (VMS) static and motion structures grounding and bonding, VMS mass connector stowage fabrication and installation, and VMS/LETF facility controls integration. This Revision also adds scope to provide the capability for the integration of the LETF Cryogenic System controls as specified in the LETF Cryogenic System design.

NASA LX has shifted the LETF Operational Readiness Date (ORD) and has updated the project schedule accordingly. This Revision updates the Task Order project schedule to match the NASA LX schedule and align the project milestones. These changes are identified in the milestone section below.

Revision B: Task Order Revision B is generated in response to Task Order Plan Revision B.

The purpose of this revision is to add scope to perform the North Tower Lighting installation, North and East Tower demolition, Area Warning Light System preliminary layout, Cryogenic System instrumentation installation, GN2 Cross-Country Line fabrication, and the remaining Vehicle Motion Simulator verification testing and remaining Video System fiber optic cable termination. Additionally this revision adds scope to develop an Operational Concepts Document, Systems Requirements Document, and Performance Work Statement for the Retractable Support Post Test Fixture. The Period of Performance has been extended from 9/30/2009 to 10/31/2009 to accommodate the additional scope.

Revision B also adds milestones 34 through 38 and updates milestones 16, 18, 28, and 29. The LETF project team determined that it would be more efficient to install the Data Acquisition System (DAS) cable tray on the Cryogenic System pipe stand foundation. Subsequently, the cable tray installation is now dependant on the pipe stand foundation installation. Therefore, milestone 16 is being updated from 3/13/2009 to 6/19/2009. The LETF project team has determined that the installation of the DAS High-Speed Boxes should not occur until required for DAS activation. This will eliminate any possible damage to the boxes that might result from other fabrication and installation tasks. Therefore, milestone 18 is being changed from installation complete to checkout complete and the date is being updated from 3/20/2009 to 4/24/2009. LETF Purge System component procurement was delayed due to changes in system requirements. This delay has impacted fabrication and installation of the LETF Purge System panels. Therefore, milestone 28 has been updated from 4/24/2009 to 5/29/2009 and milestone 29 has been updated from 6/12/2009 to 7/31/2009.

Revision A: Task Order Revision A is generated in response to Task Order Plan Revision A.

The purpose of this revision is to add the scope to perform the LETF East Tower demolition that involves the removal of the Centaur Rolling Beam Porch Structure. Revision A also adds scope for installation of the foundations for the Cryogenic System pipe stands. Revision A also removes the ODC planned for the purchase of the Vehicle Motion Simulator (VMS) control components. NASA Glenn Research Center will assume the responsibility for the VMS control component purchases and will deliver the system to be installed at the LETF by the USTDC. ODC to purchase the Programmable Logic Control (PLC) hardware for the Cryogenic System is also being removed. This hardware purchase is being deferred to CY8/FY10.

Revision A adds milestone 33. Revision A also updates milestones 4 and 11. The project schedule has been

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<p>updated to show the installation of the LETF facility and isolated grounding after the installation of the East Tower service power. The project team determined that this was a more appropriate sequence of events. Therefore, milestone 4 is being updated from 03/27/2009 to 07/10/2009. The project schedule has also been updated to shift the VMS foundation installation after the installation of the Data Acquisition System (DAS) terminal distributor foundations. This was done to stagger these two tasks to avoid physical interference that would be created during installation. Therefore, milestone 11 has been updated from 02/06/2009 to 04/17/2009. These changes have been negotiated with the NASA Task Order Manager.</p> <p>Revision A changes the Task Order Lead from Richard VanGilder to Joseph Dean.</p> <p><u>CY6/FY08 Activities:</u></p> <p>Major tasks accomplished included completion of designs for the LETF Data Acquisition System, Video System, Hazard and Gas Detection System, Cryogenic System, and the Ground Support Equipment (GSE) Integration Testbed. A subcontract was awarded to design, fabricate, assemble, and test the LETF Vehicle Motion Simulator (VMS). The design phase of the VMS was completed in CY6/FY08. The LETF Control Room refurbishment is approximately 90% complete. Fabrication activities are well under way for most LETF systems.</p> <p><u>CY7/FY09 Activities:</u></p> <p>Tasks for CY7/FY09 include fabrication, assembly, and installation of the VMS, Data Acquisition System, Video System, Hazard and Gas Detection System, Cryogenic System, and the GSE Integration Testbed. Other major tasks include completion of the LETF Control Room refurbishment and activation and validation of the LETF Data Acquisition System.</p> <p>The objective of this project is to refurbish and upgrade the Launch Equipment Test Facility (LETF) to perform Ground Support Equipment (GSE) qualification testing and follow-on sustaining test support for the Constellation program. LETF refurbishment activities include removal of unusable Shuttle hardware, sandblasting and painting of structures and fixtures, replacement of Control Room infrastructure, and upgrading the LETF electrical power and grounding systems. LETF upgrades involve replacement of outdated and failing test systems. The major test systems being upgraded include the Data Acquisition System, Video System, Hazard and Gas Detection System, Cryogenic System, and the VMS. Upgrade tasks involve design, fabrication, assembly, installation, integration, and activation of each system.</p> <p style="text-align: center;"><u>B. TASKS</u></p> <p>100.0 <u>Project Management and Scheduling Support</u></p> <p>101.0 The contractor shall provide project management support.</p> <p>102.0 The contractor shall provide project scheduling support.</p> <p>200.0 <u>LETF Refurbishment Activities</u></p> <p>201.0 The contractor shall install the Pump House Motor Control Center (MCC), associated conduit, and wiring per the Pump House Facility Power layout.</p> <p>202.0 The contractor shall connect the Pump House MCC to the new LETF transformer per the Pump House Facility Power layout.</p>		

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203.0 The contractor shall install the Facility and Isolated Grounding System per the LETF Facility Grounding layout.

204.0 The contractor shall install the East Tower service power per the LETF Facility Power layout.

205.0 The contractor shall install the terminal distributor and isolated power per the LETF Facility Power layout.

206.0 The contractor shall install the console monitors per the LETF Control Room layout.

207.0 The contractor shall install the Keyboard Video Mouse (KVM) System per the LETF Control Room layout.

208.0 The contractor shall remove the LETF East Tower Centaur Rolling Beam Porch Structure per the LETF East Tower Modification design.

209.0 The contractor shall perform demolition of the East Tower components per the LETF East Tower Modification design.

210.0 The contractor shall perform demolition of the North Tower components per the LETF North Tower Modification design.

211.0 The contractor shall install the North Tower lighting per the LETF Facility Power and Lighting layout.

212.0 The contractor shall develop the LETF Area Warning Light System preliminary layout per the LETF Facility Requirements Document.

300.0 Vehicle Motion Simulator (VMS) Activities

301.0 The contractor shall provide engineering support to assist NASA in its responsibility to provide technical oversight during development of the LETF VMS.

302.0 The contractor shall connect VMS Motor Controllers to the Pump House MCC per the NASA Glenn Research Center (GRC) provided design.

303.0 The contractor shall install the Pump House Ventilation System per the NASA GRC provided design.

304.0 The contractor shall install the VMS cooling tower foundation per the NASA GRC provided design.

305.0 The contractor shall install the VMS Cooling Water System per the NASA GRC provided design.

306.0 The contractor shall perform a system checkout of the VMS Cooling Water System per the NASA GRC provided instructions.

307.0 The contractor shall perform VMS foundation modifications per the VMS subcontractor provided design.

308.0 The contractor shall develop VMS control cable fabrication drawings per the VMS subcontractor provided design.

309.0 The contractor shall fabricate the VMS control cables per the VMS control cable fabrication drawings.

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309.1 The contractor shall fabricate and install the VMS mass connector stowage per the VMS subcontractor provided design. (TO Rev C)

310.0 The contractor shall install the VMS cable tray per the VMS subcontractor provided design.

311.0 The contractor shall install the VMS control cables per the VMS subcontractor provided design.

312.0 The contractor shall install the VMS Watchdog System per the NASA GRC provided design and instructions.

313.0 The contractor shall install the VMS Emergency Stop / Pendant System per the VMS subcontractor provided design.

313.1 The contractor shall perform integration of the VMS/LETF controls. (TO Rev C)

314.0 The contractor shall install the Vehicle Motion Simulator per the VMS subcontractor provided design and instructions.

314.1 The contractor shall install the VMS static and motion structures bonding and grounding per the LETF Facility Grounding layout. (TO Rev C)

315.0 The contractor shall develop the Operation and Maintenance Requirements and Specifications Document (OMRSD), Acceptance Test Procedure (ATP), and Operations Manual for the VMS per the VMS System Requirements Document (SRD) and design.

316.0 The contractor shall perform VMS system verification testing per the VMS subcontractor and NASA GRC instructions and the VMS Operations Manual.

400.0 Data Acquisition System (DAS) Upgrades

401.0 The contractor shall fabricate the DAS cables per the LETF DAS design.

402.0 The contractor shall fabricate the DAS terminal distributors per the LETF DAS design.

403.0 The contractor shall install the DAS terminal distributor foundations per the LETF DAS design.

404.0 The contractor shall install the DAS terminal distributors per the LETF DAS design.

405.0 The contractor shall install the DAS Cable Plant cable tray per the LETF DAS design.

406.0 The contractor shall install the DAS cables per the LETF DAS design.

407.0 The contractor shall install the 1199 Cabinet Array panels per the LETF DAS design.

408.0 The contractor shall assemble the High-Speed DAS boxes per the LETF DAS design.

409.0 The contractor shall install the High-Speed DAS boxes per the LETF DAS design.

410.0 The contractor shall fabricate and assemble the DAS Excitation Panels per the LETF DAS design.

411.0 The contractor shall install the DAS Excitation Panels per the LETF DAS design.

412.0 The contractor shall develop the software required to support National Instruments data acquisition hardware.

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413.0 The contractor shall install the National Instruments data acquisition hardware per the LETF DAS design.

414.0 The contractor shall install the DAS computers per the LETF DAS design.

415.0 The contractor shall develop the DAS OMRSD, ATP, and Operations Manual per the LETF DAS SRD and design.

416.0 The contractor shall perform DAS verification testing per the DAS ATP.

417.0 The contractor shall perform a DAS System Acceptance Review.

500.0 Video System Upgrades

501.0 The contractor shall fabricate the Global Positioning System (GPS) bracket per the Video System GPS bracket fabrication drawing.

502.0 The contractor shall install the Video System GPS per the Video System design.

503.0 The contractor shall fabricate the Video System Pan Tilt Zoom (PTZ) power supply brackets per the Video System design.

504.0 The contractor shall install the Video System PTZ power supply brackets per the Video System design.

505.0 The contractor shall assemble the Video System PTZ power supply enclosures per the Video System design.

506.0 The contractor shall install the Video System PTZ power supply enclosures per the Video System design.

507.0 The contractor shall assemble the Video System PTZ and Ethernet cables per the Video System design.

508.0 The contractor shall install the Video System Node Sites per the Video System design.

509.0 The contractor shall assemble the Video System mobile cameras per the Video System design.

510.0 The contractor shall install the Video System mobile cameras per the Video System design.

511.0 The contractor shall install the Video System fixed cameras per the Video System design.

512.0 The contractor shall install the Video System console and rack equipment per the LETF Video System design.

513.0 Fabricate and install the Video System coaxial cabling per the LETF Video System design.

514.0 The contractor shall install the fiber optic and ethernet cabling per the LETF Fiber Optic Cable Plant design.

515.0 The contractor shall terminate the fiber optic cables per the LETF Fiber Optic Cable Plant design.

516.0 The contractor shall develop the Video System OMRSD, ATP, and Operations Manual per the LETF Video System SRD and design.

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600.0 Hazard and Gas Detection System Upgrades

601.0 The contractor shall fabricate the fire and leak detector brackets and stands per the LETF Hazard and Gas Detection System design.

602.0 The contractor shall perform the fire and leak detector distribution box wiring per the LETF Hazard and Gas Detection System design.

603.0 The contractor shall fabricate the fire and leak detector terminal distributors per the LETF Hazard and Gas Detection System design.

604.0 The contractor shall fabricate the fire and leak detector cables per the LETF Hazard and Gas Detection System design.

605.0 The contractor shall install the fire and leak detector terminal distributors per the LETF Hazard and Gas Detection System design.

606.0 The contractor shall install the fire and leak detector control hardware per the LETF Hazard and Gas Detection System design.

607.0 The contractor shall install the fire and leak detector cables per the LETF Hazard and Gas Detection System design.

608.0 The contractor shall install the fire and leak detectors per the LETF Hazard and Gas Detection System design.

609.0 The contractor shall develop the Hazard and Gas Detection System OMRSD, ATP, and Operations Manual per the LETF Hazard and Gas Detection System SRD and design.

700.0 LETF Cryogenic System Upgrades

701.0 The contractor shall perform the Cryogenic System foundation repairs and dewar installation per the LETF Cryogenic System design.

702.0 The contractor shall relocate the Cryogenic System vent stack per the LETF Cryogenic System design.

703.0 The contractor shall develop the Cryogenic System pipe stand fabrication drawings.

704.0 The contractor shall fabricate the Cryogenic System piping and pipe stands per the LETF Cryogenic System design and pipe stand fabrication drawings.

705.0 The contractor shall install the pipe stand foundations, pipe stands, and piping per the LETF Cryogenic System design.

706.0 The contractor shall install the Cryogenic System components per the LETF Cryogenic System design.

706.1 The contractor shall install the Cryogenic System instrumentation per the LETF Cryogenic System design.

707.0 The contractor shall develop the LETF Purge System fabrication and installation drawings.

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708.0 The contractor shall fabricate the LETF Gaseous Nitrogen (GN2) Distribution Panels per the LETF Purge System fabrication drawings.

709.0 The contractor shall install the LETF GN2 Distribution Panels per the LETF Purge System layout and installation drawings.

710.0 The contractor shall fabricate the LETF Helium Distribution Panel per the LETF Purge System fabrication drawings.

711.0 The contractor shall install the LETF Helium Distribution Panel per the LETF Purge System layout and installation drawings.

712.0 The contractor shall install the LETF Purge system tubing per the LETF Purge System layout and installation drawings.

713.0 The contractor shall develop the Cryogenic System OMRSD, ATP, and Operations Manual per the LETF Cryogenic System SRD and design.

714.0 The contractor shall fabricate the GN2 Cross-Country Line per the LETF Cryogenic System design and LETF Purge System layout.

800.0 GSE Integration Testbed Development

801.0 The contractor shall provide engineering and technician support to assist NASA in its responsibility to install the GSE Integration Testbed hardware.

802.0 The contractor shall provide engineering support to assist NASA in its responsibility to develop the OMRSD, ATP, and Operations Manual for the GSE Integration Testbed.

803.0 The contractor shall provide engineering and technician support to assist NASA in its responsibility to perform verification testing per the GSE Integration Testbed ATP.

804.0 The contractor shall provide engineering support to assist NASA in its responsibility to perform the GSE Integration Testbed System Acceptance Review.

900.0 Retractable Support Post (RSP) Test Fixture Development

901.0 The contractor shall develop an RSP Test Fixture Operational Concepts Document.

902.0 The contractor shall develop the RSP Test Fixture System Requirements Document.

903.0 The contractor shall develop the RSP Test Fixture Performance Work Statement.

C. MILESTONES/DELIVERABLES

1. - Project management support
Start Date : 10/01/2008End Date : 10/31/2009

2. - Project scheduling support
Start Date : 10/01/2008End Date : 10/31/2009

3. - Pump House MCC installation complete
Due Date : 05/22/2009

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<p>Completed : 05/01/2009</p> <p>4. – LETF Facility and Isolated Grounding installation complete: 07/10/2009 (TO Rev C) Due Date : 08/07/2009</p> <p>5. – TD and Isolated Power installation complete Due Date : 09/18/2009</p> <p>6. – Control Room Console Monitors installation complete Due Date : 12/12/2008 Completed : 11/17/2008</p> <p>7. – Control Room KVM Switch installation complete Due Date : 07/03/2009</p> <p>8. – Engineering support to assist NASA in its responsibility to design and develop the LETF Vehicle Motion Simulator Start Date : 10/01/2008 End Date : 09/30/2009</p> <p>9. – VMS Cooling Tower Foundation installation complete Due Date : 01/30/2009 Completed : 01/26/2009</p> <p>10. – VMS Cooling Water System installation complete: 06/08/2009 (TO Rev C) Due Date : 06/26/2009</p> <p>11. – VMS Foundation modification complete Due Date : 04/17/2009 Completed : 04/17/2009</p> <p>12. – VMS Cable fabrication drawings complete Due Date : 12/12/2008 Completed : 12/11/2008</p> <p>13. – DAS Cable fabrication complete Due Date : 06/12/2009</p> <p>14. – DAS Terminal Distributor fabrication complete Due Date : 12/19/2008 Completed : 12/11/2008</p> <p>15. – DAS Terminal Distributor installation complete Due Date : 02/13/2009 Completed : 02/13/2009</p> <p>16. – DAS Cable Tray installation complete Due Date : 06/19/2009</p> <p>17. – DAS 1199 Cabinet Array Panel installation complete Due Date : 11/28/2008 Completed : 11/14/2008</p>		

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<p>18. - DAS High-Speed Boxes checkout complete Due Date : 04/24/2009 Completed : 04/24/2009</p> <p>19. - DAS Excitation Panels installation complete Due Date : 02/06/2009 Completed : 01/30/2009</p> <p>20. - LETF Data Acquisition System installation complete Due Date : 08/28/2009</p> <p>21. - DAS Documentation development complete Due Date : 07/03/2009</p> <p>22. - LETF Data Acquisition System activation/validation complete Due Date : 09/30/2009</p> <p>23. - Video System Camera installations complete Due Date : 06/19/2009</p> <p>24. - LETF Video System Documentation development complete Due Date : 05/29/2009</p> <p>25. - Fire and Leak Detectors fabrication complete Due Date : 05/01/2009 Completed : 05/01/2009</p> <p>26. - Fire and Leak Detectors installation complete: 07/10/2009 (TO Rev C) Due Date : 08/10/2009</p> <p>27. - Hazard and Gas Detection System Documentation development complete Due Date : 07/17/2009</p> <p>28. - Purge System GN2 Distribution Panel installation complete: 05/29/2009 (TO Rev C) Due Date : 09/21/2009</p> <p>29. - Purge System Helium Distribution Panel installation complete: 07/31/2009 (TO Rev C) Due Date : 08/25/2009</p> <p>31. - Cryogenic System Documentation development complete Due Date : 09/29/2009</p> <p>32. - Engineering and technical support to assist NASA in its responsibility to develop the GSE Integration Testbed Start Date : 10/01/2008 End Date : 07/15/2009</p> <p>33. - Cryogenic System Dewar installation complete Due Date : 02/27/2009 Completed : 02/24/2009</p> <p>34. - DAS Trench Cable Tray installation complete Due Date : 04/24/2009</p>		

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<p>Completed : 04/24/2009</p> <p>35. – RSP Test Fixture Operational Concepts Document complete Due Date : 05/01/2009 Completed : 05/01/2009</p> <p>36. – RSP Test Fixture SRD complete Due Date : 06/12/2009</p> <p>37. – RSP Test Fixture PWS complete Due Date : 07/24/2009</p> <p>38. – Tower demolition complete: 06/19/2009 (TO Rev C) Due Date : 08/21/2009</p> <p style="text-align: center;"><u>D. STANDARDS OF PERFORMANCE (METRICS)</u></p> <p>1. – Task Order metrics will be collected in accordance with the USTDC Internal Surveillance Plan.</p>		

TO No. 00335 TO Rev. C Plan Rev. C Year 7 Title LETF Constellation Program Support

TO Status:	IN REVISION	PM:	Eric Ernst	NE-D1	USTDC Director	Dennis Weaver	ASRC-19
Verified Date:		Customer:			USTDC Manager:	Paul Gamble	ASRC-23
Program	CONSTL				Lead	Joseph Dean	ASRC-9

A. PROJECT DESCRIPTION & SCOPE

Revision C: Task Order Revision C is generated in response to Task Order Plan Revision C.

The purpose of this Revision is to add scope to perform the Vehicle Motion Simulator (VMS) static and motion structures grounding and bonding, VMS mass connector stowage fabrication and installation, and VMS/LETF facility controls integration. This Revision also adds scope to provide the capability for the integration of the LETF Cryogenic System controls as specified in the LETF Cryogenic System design.

NASA LX has shifted the LETF Operational Readiness Date (ORD) and has updated the project schedule accordingly. This Revision updates the Task Order project schedule to match the NASA LX schedule and align the project milestones. These changes are identified in the milestone section below.

Revision B: Task Order Revision B is generated in response to Task Order Plan Revision B.

The purpose of this revision is to add scope to perform the North Tower Lighting installation, North and East Tower demolition, Area Warning Light System preliminary layout, Cryogenic System instrumentation installation, GN2 Cross-Country Line fabrication, and the remaining Vehicle Motion Simulator verification testing and remaining Video System fiber optic cable termination. Additionally this revision adds scope to develop an Operational Concepts Document, Systems Requirements Document, and Performance Work Statement for the Retractable Support Post Test Fixture. The Period of Performance has been extended from 9/30/2009 to 10/31/2009 to accommodate the additional scope.

Revision B also adds milestones 34 through 38 and updates milestones 16, 18, 28, and 29. The LETF project team determined that it would be more efficient to install the Data Acquisition System (DAS) cable tray on the Cryogenic System pipe stand foundation. Subsequently, the cable tray installation is now dependant on the pipe stand foundation installation. Therefore, milestone 16 is being updated from 3/13/2009 to 6/19/2009. The LETF project team has determined that the installation of the DAS High-Speed Boxes should not occur until required for DAS activation. This will eliminate any possible damage to the boxes that might result from other fabrication and installation tasks. Therefore, milestone 18 is being changed from installation complete to checkout complete and the date is being updated from 3/20/2009 to 4/24/2009. LETF Purge System component procurement was delayed due to changes in system requirements. This delay has impacted fabrication and installation of the LETF Purge System panels. Therefore, milestone 28 has been updated from 4/24/2009 to 5/29/2009 and milestone 29 has been updated from 6/12/2009 to 7/31/2009.

Revision A: Task Order Revision A is generated in response to Task Order Plan Revision A.

USTDC Technical Lead SIGNATURE <i>Joseph N. Dean</i> DATE <i>5/18/2009</i>	USTDC S&MA SIGNATURE <i>Robert E. Hummel</i> DATE <i>05/18/09</i> For Raymond Anderson Robert E. Hummel
USTDC Manager SIGNATURE <i>Paul Gamble</i> DATE <i>5/18/09</i>	NASA Approvals
USTDC Director SIGNATURE <i>Dennis Weaver</i> DATE <i>5/18/09</i>	Task Order Manager / Org SIGNATURE <i>E. Ernst</i> DATE <i>5/18/09</i> Eric Ernst / NE-D1
USTDC PCB SIGNATURE <i>Pedro Medeiros</i> DATE <i>5/18/09</i>	Contract Technical Manager / Org SIGNATURE <i>Heredith Chandler</i> DATE <i>5/28/09</i> Ned Voska / NE-I2

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The purpose of this revision is to add the scope to perform the LETF East Tower demolition that involves the removal of the Centaur Rolling Beam Porch Structure. Revision A also adds scope for installation of the foundations for the Cryogenic System pipe stands. Revision A also removes the ODC planned for the purchase of the Vehicle Motion Simulator (VMS) control components. NASA Glenn Research Center will assume the responsibility for the VMS control component purchases and will deliver the system to be installed at the LETF by the USTDC. ODC to purchase the Programmable Logic Control (PLC) hardware for the Cryogenic System is also being removed. This hardware purchase is being deferred to CY8/FY10.

Revision A adds milestone 33. Revision A also updates milestones 4 and 11. The project schedule has been updated to show the installation of the LETF facility and isolated grounding after the installation of the East Tower service power. The project team determined that this was a more appropriate sequence of events. Therefore, milestone 4 is being updated from 03/27/2009 to 07/10/2009. The project schedule has also been updated to shift the VMS foundation installation after the installation of the Data Acquisition System (DAS) terminal distributor foundations. This was done to stagger these two tasks to avoid physical interference that would be created during installation. Therefore, milestone 11 has been updated from 02/06/2009 to 04/17/2009. These changes have been negotiated with the NASA Task Order Manager.

Revision A changes the Task Order Lead from Richard VanGilder to Joseph Dean.

CY6/FY08 Activities:

Major tasks accomplished included completion of designs for the LETF Data Acquisition System, Video System, Hazard and Gas Detection System, Cryogenic System, and the Ground Support Equipment (GSE) Integration Testbed. A subcontract was awarded to design, fabricate, assemble, and test the LETF Vehicle Motion Simulator (VMS). The design phase of the VMS was completed in CY6/FY08. The LETF Control Room refurbishment is approximately 90% complete. Fabrication activities are well under way for most LETF systems.

CY7/FY09 Activities:

Tasks for CY7/FY09 include fabrication, assembly, and installation of the VMS, Data Acquisition System, Video System, Hazard and Gas Detection System, Cryogenic System, and the GSE Integration Testbed. Other major tasks include completion of the LETF Control Room refurbishment and activation and validation of the LETF Data Acquisition System.

The objective of this project is to refurbish and upgrade the Launch Equipment Test Facility (LETF) to perform Ground Support Equipment (GSE) qualification testing and follow-on sustaining test support for the Constellation program. LETF refurbishment activities include removal of unusable Shuttle hardware, sandblasting and painting of structures and fixtures, replacement of Control Room infrastructure, and upgrading the LETF electrical power and grounding systems. LETF upgrades involve replacement of outdated and failing test systems. The major test systems being upgraded include the Data Acquisition System, Video System, Hazard and Gas Detection System, Cryogenic System, and the VMS. Upgrade tasks involve design, fabrication, assembly, installation, integration, and activation of each system.

B. MILESTONES/DELIVERABLES

1. - Project management support

Start Date : 10/01/2008 End Date : 10/31/2009

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<div style="padding: 10px;"> <p>2. - Project scheduling support Start Date : 10/01/2008 End Date : 10/31/2009</p> <p>3. - Pump House MCC installation complete Due Date : 05/22/2009 Completed : 05/01/2009</p> <p>4. - LETF Facility and Isolated Grounding installation complete: 07/10/2009 (TO Rev C) Due Date : 08/07/2009</p> <p>5. - TD and Isolated Power installation complete Due Date : 09/18/2009</p> <p>6. - Control Room Console Monitors installation complete Due Date : 12/12/2008 Completed : 11/17/2008</p> <p>7. - Control Room KVM Switch installation complete Due Date : 07/03/2009</p> <p>8. - Engineering support to assist NASA in its responsibility to design and develop the LETF Vehicle Motion Simulator Start Date : 10/01/2008 End Date : 09/30/2009</p> <p>9. - VMS Cooling Tower Foundation installation complete Due Date : 01/30/2009 Completed : 01/26/2009</p> <p>10. - VMS Cooling Water System installation complete: 06/08/2009 (TO Rev C) Due Date : 06/26/2009</p> <p>11. - VMS Foundation modification complete Due Date : 04/17/2009 Completed : 04/17/2009</p> <p>12. - VMS Cable fabrication drawings complete Due Date : 12/12/2008 Completed : 12/11/2008</p> <p>13. - DAS Cable fabrication complete Due Date : 06/12/2009</p> <p>14. - DAS Terminal Distributor fabrication complete Due Date : 12/19/2008 Completed : 12/11/2008</p> <p>15. - DAS Terminal Distributor installation complete Due Date : 02/13/2009 Completed : 02/13/2009</p> <p>16. - DAS Cable Tray installation complete</p> </div>		

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<p>Due Date : 06/19/2009</p> <p>17. - DAS 1199 Cabinet Array Panel installation complete Due Date : 11/28/2008 Completed : 11/14/2008</p> <p>18. - DAS High-Speed Boxes checkout complete Due Date : 04/24/2009 Completed : 04/24/2009</p> <p>19. - DAS Excitation Panels installation complete Due Date : 02/06/2009 Completed : 01/30/2009</p> <p>20. - LETF Data Acquisition System installation complete Due Date : 08/28/2009</p> <p>21. - DAS Documentation development complete Due Date : 07/03/2009</p> <p>22. - LETF Data Acquisition System activation/validation complete Due Date : 09/30/2009</p> <p>23. - Video System Camera installations complete Due Date : 06/19/2009</p> <p>24. - LETF Video System Documentation development complete Due Date : 05/29/2009</p> <p>25. - Fire and Leak Detectors fabrication complete Due Date : 05/01/2009 Completed : 05/01/2009</p> <p>26. - Fire and Leak Detectors installation complete: 07/10/2009 (TO Rev C) Due Date : 08/10/2009</p> <p>27. - Hazard and Gas Detection System Documentation development complete Due Date : 07/17/2009</p> <p>28. - Purge System GN2 Distribution Panel installation complete: 05/29/2009 (TO Rev C) Due Date : 09/21/2009</p> <p>29. - Purge System Helium Distribution Panel installation complete: 07/31/2009 (TO Rev C) Due Date : 08/25/2009</p> <p>31. - Cryogenic System Documentation development complete Due Date : 09/29/2009</p> <p>32. - Engineering and technical support to assist NASA in its responsibility to develop the GSE Integration Testbed Start Date : 10/01/2008 End Date : 07/15/2009</p>		

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33. – Cryogenic System Dewar installation complete
Due Date : 02/27/2009
Completed : 02/24/2009

34. – DAS Trench Cable Tray installation complete
Due Date : 04/24/2009
Completed : 04/24/2009

35. – RSP Test Fixture Operational Concepts Document complete
Due Date : 05/01/2009
Completed : 05/01/2009

36. – RSP Test Fixture SRD complete
Due Date : 06/12/2009

37. – RSP Test Fixture PWS complete
Due Date : 07/24/2009

38. – Tower demolition complete: ~~06/19/2009~~ (TO Rev C)
Due Date : 08/21/2009

C. TECHNICAL APPROACH

Upon completion of each task, the Task Order Manager will be notified by e-mail. All hardware will be delivered in place at the LETF and will be maintained per the LETF Maintenance Plan. All drawings and documents produced will be delivered in Windchill. Software and computers for systems at the LETF will be maintained per the USTDC IT Security Plan, USTDC-SOP-5. 1 through 5.19.

Task 100: Project Management and Scheduling Support (WBS 1.1)

Task 101: The contractor shall provide project management support. (WBS 1.1.1) (Milestone 1)
The USTDC will provide project management support for project planning and management activities as requested by the NASA Task Order Manager. This will include developing cost estimates, project schedules, project requirements, technical input and evaluations, as well as implementing project plans, providing status, and attending meetings and reviews. The USTDC Project Manager will also update the Task Order Status Report (TOSR) monthly and review with the Task Order Manager.

Task 102: The contractor shall provide project scheduling support. (WBS 1.1.2) (Milestone 2)
The USTDC will provide project scheduling support to maintain and update the LETF Level IV Constellation Primavera schedule as required by the NASA Constellation Ground Systems Project. Schedule update information will be gathered by the USTDC Project Manager from the LETF system leads and team members. The USTDC Project Manager will communicate the updates to the USTDC Constellation Primavera scheduler. The schedule will be reviewed by the project team during LETF status meetings.

Task 200: LETF Refurbishment Activities (WBS 1.2)

Task 201: The contractor shall install the Pump House Motor Control Center (MCC), associated conduit, and wiring per the Pump House Facility Power layout. (WBS 1.2.1)
The USTDC will install the Pump House Motor Control Center (MCC) including associated conduit and wiring per the Pump House facility power layout. Detailed work instructions will also be included in a

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Task 211: The contractor shall install the North Tower lighting per the LETF Facility Power and Lighting layout. (WBS 1.2.5.3)
The USTDC will install the North Tower lighting per the LETF Facility Power and Lighting layout and instructions detailed in a USTDC Work Authorization Control document.

Task 212: The contractor shall develop the LETF Area Warning Light System preliminary layout per the LETF Facility Requirements Document. (WBS 1.2.6.1)
The USTDC will develop the LETF Area Warning Light System preliminary layout per the LETF Facility Requirements Document. The layout drawings will be created utilizing AutoCAD Electrical 2007. The scope of creating final as-built drawings will be added in a future revision.

Task 300: Vehicle Motion Simulator (VMS) Activities (WBS 1.3)

Task 301: The contractor shall provide engineering support to assist NASA in its responsibility to provide technical oversight during development of the LETF VMS. (WBS 1.3.1.1) (Milestone 8)
The USTDC will provide engineering support to assist NASA in its responsibility for development of the LETF VMS. The development of the LETF VMS is a joint responsibility of NASA Engineering at the Glenn Research Center (GRC) in Ohio, NASA NE at KSC, and USTDC. A subcontractor has been contracted by USTDC to design, fabricate, install, and activate the VMS. The contract is based on a performance work statement with technical specifications developed by NASA GRC and USTDC. As of October 1, 2008, the design phase of the subcontract is complete and the subcontractor has begun fabrication. The subcontract is being managed by the USTDC procurement office. NASA GRC will provide technical oversight of the subcontract. The USTDC will provide an LETF engineering point-of-contact to serve as a liaison between KSC and GRC and to provide technical input. The LETF engineering point-of-contact is expected to become the KSC VMS expert that will oversee installation, activation and operation. The USTDC will procure materials, previously planned as Government Furnished Equipment (GFE), required for the VMS ancillary systems that are being designed by engineers at NASA's Glenn Research Center. Purchase requests will be generated by the USTDC and submitted to the USTDC procurement office for processing.

Task 302: The contractor shall connect VMS Motor Controllers to the Pump House MCC per the NASA Glenn Research Center (GRC) provided design. (WBS 1.3.1.3)
The USTDC will install the electrical service including conduit and wiring from the Pump House MCC up to the VMS motor controllers per NASA GRC provided designs and instructions that will be detailed in a USTDC Work Authorization Control document. Final electrical connections will be performed after delivery and installation of the VMS hydraulic pumps.

Task 303: The contractor shall install the Pump House Ventilation System per the NASA GRC provided design. (WBS 1.3.1.4)
The USTDC will install the Pump House Ventilation System per designs provided by NASA GRC and instructions that will be detailed in a USTDC Work Authorization Control document.

Task 304: The contractor shall install the VMS cooling tower foundation per the NASA GRC provided design. (WBS 1.3.1.5) (Milestone 9)
The USTDC will develop a statement of work and procure a subcontractor to install the VMS Cooling Water System foundation per NASA GRC provided designs. The foundation design and statement of work will be reviewed by NASA TA and the USTDC before soliciting bids. The USTDC will provide engineering oversight of the subcontract.

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Tasks 305 and 306: The contractor shall install the VMS Cooling Water System per the NASA GRC provided design. (WBS 1.3.1.7)

The contractor shall perform a system checkout of the VMS Cooling Water System per the NASA GRC provided instructions. (WBS 1.3.1.8) (Milestone 10)

The USTDC will install the VMS Cooling Water System and perform a system checkout per NASA GRC provided designs and instructions that will be detailed in a USTDC Work Authorization Control document. Final hookup of the cooling water system will be performed after delivery and installation of the VMS hydraulic pumps.

Task 307: The contractor shall perform VMS foundation modifications per the VMS subcontractor provided design. (WBS 1.3.1.10 and 1.3.1.11) (Milestone 11)

The USTDC will develop a statement of work and procure a subcontractor to perform the VMS foundation modifications per VMS subcontractor provided designs. The foundation design and statement of work will be reviewed by NASA TA and the USTDC before soliciting bids. The USTDC will provide engineering oversight of the subcontract.

Task 308: The contractor shall develop VMS control cable fabrication drawings per the VMS subcontractor provided design. (WBS 1.3.1.13) (Milestone 12)

The USTDC will develop cable fabrication drawings per VMS subcontractor provided designs. The drawings will be developed utilizing AutoCAD Electrical 2007. The drawings will be reviewed and approved by the USTDC Electrical Systems group and the LETF Project team prior to fabrication.

Tasks 309, 309.1, (TP Rev C) 310, and 311: The contractor shall fabricate the VMS control cables per the VMS control cable fabrication drawings. (WBS 1.3.1.15)

The contractor shall fabricate and install the VMS mass connector stowage per the VMS subcontractor provided design. (WBS 1.3.1.16) (TP Rev C)

The contractor shall install the VMS cable tray per the VMS subcontractor provided design. (WBS 1.3.1.17)

The contractor shall install the VMS control cables per the VMS subcontractor provided design. (WBS 1.3.1.18)

The USTDC will fabricate and install the VMS cable tray, **mass connector stowage, (TP Rev C)** and control cables per VMS subcontractor provided designs, cable fabrication drawings, and instructions that will be detailed in a USTDC Work Authorization Control document.

Tasks 312 and 313 : The contractor shall install the VMS Watchdog System per the NASA GRC provided design and instructions. (WBS 1.3.1.19)

The contractor shall install the VMS Emergency Stop / Pendant System per the VMS subcontractor provided design. (WBS 1.3.1.20)

The USTDC will install the Emergency Stop / Pendant System and the VMS Watchdog System per NASA GRC provided designs and instructions which will be detailed in a USTDC Work Authorization Control document.

Task 313.1 : The contractor shall perform integration of the VMS/LETF controls. (WBS 1.3.1.23)

The USTDC will perform integration of the VMS/LETF controls per NASA GRC and VMS subcontractor provided designs. (TP Rev C)

Task 314: The contractor shall install the Vehicle Motion Simulator per the VMS subcontractor provided design and instructions. (WBS 1.3.1.22)

As part of the VMS subcontract, the subcontractor will install the VMS per designs and instructions

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<p>provided by the VMS subcontractor. The designs have been reviewed and approved by the LETF Project team including NASA GRC and NASA NE. USTDC will provide engineering and technical support during VMS installation. This includes operation of cranes, forklifts, and man lifts. The details will be included in a change order to the VMS subcontract that will include the VMS installation.</p> <p><i>Task 314.1 : The contractor shall install the VMS static and motion structures bonding and grounding per the LETF Facility Grounding layout. (WBS 1.3.1.24)</i> USTDC will install the VMS static and motion structures bonding and grounding per the LETF Facility Grounding layout and instructions which will be detailed in a USTDC Work Authorization Control document. (TP Rev C)</p> <p><i>Task 315: The contractor shall develop the Operation and Maintenance Requirements and Specifications Document (OMRSD), Acceptance Test Procedure (ATP), and Operations Manual for the VMS per the VMS System Requirements Document (SRD) and design. (WBS 1.3.1.25)</i> The USTDC will develop an OMRSD, ATP, and Operations Manual for the Vehicle Motion Simulator utilizing formats approved by the Task Order Manager and the project team. The OMRSD, ATP, and Operations Manual will be developed by the USTDC design lead from data provided by the VMS subcontractor and NASA GRC and will be reviewed and accepted by the project team.</p> <p><i>Task 316: The contractor shall perform VMS system verification testing per the VMS subcontractor and NASA GRC instructions and the VMS Operations Manual. (WBS 1.3.2.1)</i> Upon completion of the VMS installation, the VMS subcontractor will perform verification testing per VMS subcontractor provided instructions. USTDC will provide engineering and technical support during verification testing. This testing will demonstrate compliance to the requirements stated in the VMS performance work statement. Upon satisfactory completion of the verification testing, USTDC will perform the system activation / validation testing currently scheduled to be performed in FY10.</p> <p><i>Task 400: Data Acquisition System (DAS) Upgrades (WBS (1. 4)</i></p> <p><i>Tasks 401 and 406: The contractor shall fabricate the DAS cables per the LETF DAS design. (WBS 1.4.1.1) (Milestone 13)</i> <i>The contractor shall install the DAS cables per the LETF DAS design. (WBS 1.4.1.11) (Milestone 20)</i> The USTDC will fabricate and install the LETF Data Acquisition System cables per the LETF Data Acquisition System design. Fabrication will be performed in the LETF Cable and Molding Shop. Fabrication and installation instructions will be detailed in USTDC Work Authorization Control documents.</p> <p><i>Tasks 402, 403, and 404: The contractor shall fabricate the DAS terminal distributors per the LETF DAS design. (WBS 1.4.1.3) (Milestone 14)</i> <i>The contractor shall install the DAS terminal distributor foundations per the LETF DAS design. (WBS 1.4.1.5)</i> <i>The contractor shall install the DAS terminal distributors per the LETF DAS design. (WBS 1.4.1.6) (Milestone 15)</i> The USTDC will fabricate and install the LETF Data Acquisition System terminal distributors per the LETF Data Acquisition System design and instructions detailed in a USTDC Work Authorization Control document. Fabrication will be performed in the LETF shops utilizing materials specified in the LETF Data Acquisition System design. The USTDC will develop a statement of work and procure a subcontractor to install the terminal distributor foundations per the LETF Data Acquisition System design. The foundation design and statement of work will be reviewed by NASA TA and the USTDC before soliciting bids. The</p>		

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USTDC will provide engineering oversight of the subcontract.

Task 405: The contractor shall install the DAS Cable Plant cable tray per the LETF DAS design. (WBS 1.4.1.8) (Milestones 16 and 34)
The USTDC will install the LETF Cable Plant cable tray per the LETF Data Acquisition System design and instructions detailed in a USTDC Work Authorization Control document.

Task 407: The contractor shall install the 1199 Cabinet Array panels per the LETF DAS design. (WBS 1.4.1.12) (Milestone 17)
The USTDC will install the LETF Control Room 1199 Cabinet Array panels per the LETF Data Acquisition System design and instructions detailed in a USTDC Work Authorization Control document.

Tasks 408 and 409: The contractor shall assemble the High-Speed DAS boxes per the LETF DAS design. (WBS 1.4.1.14)
The contractor shall install the High-Speed DAS boxes per the LETF DAS design. (WBS 1.4.1.15) (Milestone 18)
The USTDC will assemble and install the High-Speed DAS boxes per the LETF Data Acquisition System design and instructions detailed in a USTDC Work Authorization Control document.

Tasks 410 and 411: The contractor shall fabricate and assemble the DAS Excitation Panels per the LETF DAS design. (WBS 1.4.1.17)
The contractor shall install the DAS Excitation Panels per the LETF DAS design. (WBS 1.4.1.18) (Milestone 19)
The USTDC will fabricate, assemble, and install the DAS Excitation Panels per the LETF Data Acquisition System design and instructions detailed in a USTDC Work Authorization Control document.

Task 412: The contractor shall develop the software required to support National Instruments data acquisition hardware. (WBS 1.4.1.20)
The USTDC will use previously purchased LabView software to develop an interface with the National Instruments data acquisition hardware. This software will be installed on the Data Acquisition System computers that will be located in the LETF Control Room. The Mechanical, Structural and Controls Development Shop has obtained a waiver (#08-0721-03) for the purchase of IT equipment for non-ODIN computers, issued by the NASA KSC CIO, approved on 07/28/08. The LETF Control Room is part of the Data Acquisition System Laboratory which is covered by this waiver. The waiver is attached.

Tasks 413 and 414: The contractor shall install the National Instruments data acquisition hardware per the LETF DAS design. (WBS 1.4.1.21)
The contractor shall install the DAS computers per the LETF DAS design. (WBS 1.4.1.22) (Milestone 20)
The USTDC will install the LETF Data Acquisition System National Instruments hardware and computers per the LETF Data Acquisition System design and instructions detailed in a USTDC Work Authorization Control document. The computers will be installed in the LETF Control Room as part of the LETF Data Acquisition System. The Mechanical, Structural and Controls Development Shop has obtained a waiver (#08-0721-03) for the purchase of IT equipment for non-ODIN computers, issued by the NASA KSC CIO, approved on 07/28/08. The LETF Control Room is part of the Data Acquisition System Laboratory which is covered by this waiver. The waiver is attached.

Task 415: The contractor shall develop the DAS OMRSD, ATP, and Operations Manual per the LETF DAS SRD and design. (WBS 1.4.1.24) (Milestone 21)
The USTDC will develop an OMRSD, ATP, and Operations Manual for the Data Acquisition System utilizing

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<p>formats approved by the Task Order Manager and the project team. The OMRSD, ATP, and Operations Manual will be developed by the USTDC design lead and reviewed and accepted by the project team.</p> <p><i>Tasks 416 and 417: The contractor shall perform DAS verification testing per the DAS ATP. (WBS 1.4.2.1) The contractor shall perform a DAS System Acceptance Review. (WBS 1.4.2.2) (Milestone 22)</i></p> <p>Upon completion of the Data Acquisition System installation, the USTDC will perform verification testing per the DAS ATP and instructions detailed in a USTDC Work Authorization Control document. As part of the system activation, a system acceptance review will be held by the LETF project team to formally acknowledge that the system performance meets requirements specified in the DAS SRD and is ready for operations.</p> <p><i>Task 500: Video System Upgrades (WBS 1.5)</i></p> <p><i>Tasks 501 through 511: The contractor shall fabricate the Global Positioning System (GPS) bracket per the Video System GPS bracket fabrication drawing. (WBS 1.5.1.1)</i></p> <p><i>The contractor shall install the Video System GPS per the Video System design. (WBS 1.5.1.2)</i></p> <p><i>The contractor shall fabricate the Video System Pan Tilt Zoom (PTZ) power supply brackets per the Video System design. (WBS 1.5.1.3)</i></p> <p><i>The contractor shall install the Video System PTZ power supply brackets per the Video System design. (WBS 1.5.1.4)</i></p> <p><i>The contractor shall assemble the Video System PTZ power supply enclosures per the Video System design. (WBS 1.5.1.5)</i></p> <p><i>The contractor shall install the Video System PTZ power supply enclosures per the Video System design. (WBS 1.5.1.6)</i></p> <p><i>The contractor shall assemble the Video System PTZ and Ethernet cables per the Video System design. (WBS 1.5.1.7)</i></p> <p><i>The contractor shall install the Video System Node Sites per the Video System design. (WBS 1.5.1.8)</i></p> <p><i>The contractor shall assemble the Video System mobile cameras per the Video System design. (WBS 1.5.1.9)</i></p> <p><i>The contractor shall install the Video System mobile cameras per the Video System design. (WBS 1.5.1.10)</i></p> <p><i>The contractor shall install the Video System fixed cameras per the Video System design. (WBS 1.5.1.11) (Milestone 23)</i></p> <p>The USTDC will fabricate the LETF Video System GPS bracket and PTZ power supply brackets per the LETF Video System bracket fabrication drawings and instructions detailed in a USTDC Work Authorization Control document. Fabrication will be performed in the LETF shops utilizing materials specified in the LETF Video System bracket fabrication drawings. Upon completion of bracket fabrications, the USTDC will assemble and install the Video System GPS, The PTZ power supply enclosures, the PTZ and ethernet cables, the node site hardware, the mobile cameras, and fixed cameras per the LETF Video System design and instructions detailed in a USTDC Work Authorization Control document.</p> <p><i>Task 512: The contractor shall install the Video System console and rack equipment per the LETF Video System design. (WBS 1.5.1.13)</i></p> <p>The USTDC will install the LETF Video System console and rack equipment per the LETF Video System design. Installation instructions will be detailed in a USTDC Work Authorization Control document.</p> <p><i>Task 513: Fabricate and install the Video System coaxial cabling per the LETF Video System design. (WBS 1.5.1.14)</i></p> <p>The USTDC will fabricate and install the LETF Video System coax cables per the LETF Video System design.</p>		

LETF Constellation

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<p>Installation instructions will be detailed in a USTDC Work Authorization Control document.</p> <p><i>Tasks 514 and 515: The contractor shall install the fiber optic and ethernet cabling per the LETF Fiber Optic Cable Plant design. (WBS 1.5.1.15)</i></p> <p><i>The contractor shall terminate the fiber optic cables per the LETF Fiber Optic Cable Plant design. (WBS 1.5.1.16)</i></p> <p>The USTDC will install and terminate the LETF Fiber Optic and Ethernet Cable Plant per the LETF Fiber Optic Cable Plant design and instructions detailed in a USTDC Work Authorization Control document. The LETF Fiber Optic Cable Plant design is part of the LETF Video System design.</p> <p><i>Task 516: The contractor shall develop the Video System OMRSD, ATP, and Operations Manual per the LETF Video System SRD and design. (WBS 1.5.1.17) (Milestone 24)</i></p> <p>The USTDC will develop an OMRSD, ATP, and Operations Manual for the LETF Video System utilizing formats approved by the Task Order Manager and the project team. The OMRSD, ATP, and Operations Manual will be developed by the USTDC design lead and reviewed and accepted by the project team.</p> <p><i>Task 600: Hazard and Gas Detection System Upgrades (WBS 1.6)</i></p> <p><i>Tasks 601 through 608: The contractor shall perform the fire and leak detector distribution box wiring per the LETF Hazard and Gas Detection System design. (WBS 1.6.1.1)</i></p> <p><i>The contractor shall fabricate the fire and leak detector brackets and stands per the LETF Hazard and Gas Detection System design. (WBS 1.6.1.2)</i></p> <p><i>The contractor shall fabricate the fire and leak detector terminal distributors per the LETF Hazard and Gas Detection System design. (WBS 1.6.1.3)</i></p> <p><i>The contractor shall fabricate the fire and leak detector cables per the LETF Hazard and Gas Detection System design. (WBS 1.6.1.6) (Milestone 25)</i></p> <p><i>The contractor shall install the fire and leak detector terminal distributors per the LETF Hazard and Gas Detection System design. (WBS 1.6.1.7)</i></p> <p><i>The contractor shall install the fire and leak detector control hardware per the LETF Hazard and Gas Detection System design. (WBS 1.6.1.8)</i></p> <p><i>The contractor shall install the fire and leak detector cables per the LETF Hazard and Gas Detection System design. (WBS 1.6.1.9)</i></p> <p><i>The contractor shall install the fire and leak detectors per the LETF Hazard and Gas Detection System design. (WBS 1.6.1.10) (Milestone 26)</i></p> <p>The USTDC will fabricate, assemble, and install the LETF Hazard and Gas Detection System per the LETF Hazard and Gas Detection System design. The fabrication, assembly, and installation of the fire and leak detector portion of the LETF Hazard and Gas Detection System are covered under this task order. The fabrication, assembly and installation of the Remote Leak Detection and Mass Spectrum Leak Detection Systems is the responsibility of the Constellation Mobile Launcher project. The fabrication, assembly, and installation of the fire and leak detector portion of the LETF Hazard and Gas Detection System includes bracket and stand fabrication, distribution box wiring, terminal distributor fabrication and installation, signal cable fabrication and installation, PLC hardware installation, and the fire and leak detectors installation. The fabrication, assembly, and installation of the fire and leak detector portion of the LETF Hazard and Gas Detection System will be performed per instructions detailed in a USTDC Work Authorization Control document.</p> <p><i>Task 609: The contractor shall develop the Hazard and Gas Detection System OMRSD, ATP, and Operations Manual per the LETF Hazard and Gas Detection System SRD and design. (WBS 1.6.1.12)</i></p>		

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<p><i>(Milestone 27)</i> The USTDC will develop an OMRSD, ATP, and Operations Manual for the LETF Hazard and Gas Detection System utilizing formats approved by the Task Order Manager and the project team. The OMRSD, ATP, and Operations Manual will be developed by the USTDC design lead and reviewed and accepted by the project team.</p> <p><i>Task 700: LETF Cryogenic System Upgrades (WBS 1.7)</i></p> <p><i>Task 701: The contractor shall perform the Cryogenic System foundation repairs and dewar installation per the LETF Cryogenic System design. (WBS 1.7.1.1.1) (Milestone 33)</i> The USTDC will perform rework of the LETF Cryogenic System dewar foundation and install the Cryogenic System dewars per the updated LETF Cryogenics System foundation design and instructions detailed in a USTDC Work Authorization Control document. The updated foundation design will be reviewed and approved by NASA TA, NASA NE, and USTDC before rework is performed.</p> <p><i>Task 702: The contractor shall relocate the Cryogenic System vent stack per the LETF Cryogenic System design. (WBS 1.7.1.1.3)</i> The USTDC will relocate the LETF Cryogenic System vent stack and associated hardware per the LETF Cryogenic System design and instructions detailed in a USTDC Work Authorization Control document.</p> <p><i>Task 703: The contractor shall develop the Cryogenic System pipe stand fabrication drawings. (WBS 1.7.1.1.4)</i> The USTDC will create fabrication drawings for the LETF Cryogenic System pipe stands required for the Cryogenic System piping installation. The drawings will be created based on equipment dimensions specified in the Cryogenic System design and input from the USTDC system designer. The fabrication drawings will be reviewed and approved by the LETF Project team prior to fabrication.</p> <p><i>Task 704: The contractor shall fabricate the Cryogenic System piping and pipe stands per the LETF Cryogenic System design and pipe stand fabrication drawings. (WBS 1.7.1.1.5)</i> The USTDC will fabricate the LETF Cryogenics System piping and pipe stands per the LETF Cryogenics System design and pipe stand fabrication drawings. Fabrication will be performed in the LETF Weld Shop. Fabrication instructions will be detailed in a USTDC Work Authorization Control document.</p> <p><i>Task 705: The contractor shall install the pipe stand foundations , pipe stands, and piping per the LETF Cryogenic System design. (WBS 1.7.1.1.6 and 1.7.1.1.7)</i> The USTDC will install the LETF Cryogenic System pipe stands and piping per the LETF Cryogenics System design. Installation instructions will be detailed in a USTDC Work Authorization Control document. The USTDC will develop a statement of work for the installation of the pipe stand foundations per the Cryogenic System design. The USTDC will identify a subcontractor to execute the installation of the pipe stand foundations per the Cryogenic System design. The foundation design and statement of work will be reviewed by NASA TA and the USTDC before soliciting bids. The USTDC will provide engineering oversight of the subcontract.</p> <p><i>Task 706: The contractor shall install the Cryogenic System components per the LETF Cryogenic System design. (WBS 1.7.1.1.8)</i> The USTDC will install the LETF Cryogenic System components and associated hardware per the LETF Cryogenic System design and instructions detailed in a USTDC Work Authorization Control document.</p> <p><i>Task 706.1: The contractor shall install the Cryogenic System instrumentation per the LETF Cryogenic</i></p>		

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<p><i>System design. (WBS 1.7.1.1.9)</i> The USTDC will install the LETF Cryogenic System instrumentation per the LETF Cryogenic System design and instructions detailed in a USTDC Work Authorization Control document.</p> <p><i>Task 707: The contractor shall develop the LETF Purge System fabrication and installation drawings. (WBS 1.7.1.2.1)</i> The USTDC will develop the fabrication and installation drawings for the LETF Purge System. The drawings will be developed based on requirements specified in the Cryogenic System design, LETF Purge System Assessment, and input from the USTDC system designer. The drawings will be reviewed and approved by the LETF Project team prior to fabrication and installation.</p> <p><i>Tasks 708 and 709: The contractor shall fabricate the LETF Gaseous Nitrogen (GN2) Distribution Panels per the LETF Purge System fabrication drawings. (WBS 1.7.1.2.2)</i> <i>The contractor shall install the LETF GN2 Distribution Panels per the LETF Purge System layout and installation drawings. (WBS 1.7.1.2.3) (Milestone 28)</i> The USTDC will fabricate and install the LETF Purge System GN2 Distribution Panels per the LETF Purge System layout, Purge System fabrication and installation drawings, and instructions detailed in a USTDC Work Authorization Control document.</p> <p><i>Tasks 710 and 711: The contractor shall fabricate the LETF Helium Distribution Panel per the LETF Purge System fabrication drawings. (WBS 1.7.1.2.5)</i> <i>The contractor shall install the LETF Helium Distribution Panel per the LETF Purge System layout and installation drawings. (WBS 1.7.1.2.6) (Milestone 29)</i> The USTDC will fabricate and install the LETF Purge System Helium Purge Panel per the LETF Purge System layout, Purge System fabrication and installation drawings, and instructions detailed in a USTDC Work Authorization Control document.</p> <p><i>Task 712: The contractor shall install the LETF Purge system tubing per the LETF Purge System layout and installation drawings. (WBS 1.7.1.2.8) (Milestone 30)</i> The USTDC will install the LETF Purge System tubing and associated hardware per the LETF Purge System layout, Purge System fabrication and installation drawings, and instructions detailed in a USTDC Work Authorization Control document.</p> <p><i>Task 713: The contractor shall develop the Cryogenic System OMRSD, ATP, and Operations Manual per the LETF Cryogenic System SRD and design. (WBS 1.7.1.2.10) (Milestone 31)</i> The USTDC will develop an OMRSD, ATP, and Operations Manual for the LETF Cryogenic System utilizing formats approved by the Task Order Manager and the project team. The OMRSD, ATP, and Operations Manual will be developed by the USTDC design lead and reviewed and accepted by the project team.</p> <p><i>Task 714: The contractor shall fabricate the GN2 Cross-Country Line per the LETF Cryogenic System design and the LETF Purge System layout. (WBS 1.7.1.3.1)</i> The USTDC will fabricate the GN2 Cross-Country Line per the LETF Cryogenic System design, the LETF Purge System layout, and instructions detailed in a USTDC Work Authorization Control document.</p> <p><i>Task 800: GSE Integration Testbed Development (WBS 1.8)</i></p> <p><i>Task 801: The contractor shall provide engineering and technician support to assist NASA in its responsibility to install the GSE Integration Testbed hardware. (WBS 1.8.1.1) (Milestone 32)</i> The USTDC will provide technician support to assist NASA in its responsibility to develop the GSE</p>		

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<p>Integration Testbed including hardware installation, system wiring and final installation in the LETF Highbay. The USTDC will provide technician support to perform installations and system wiring as directed by the NASA NE design engineer.</p> <p><i>Task 802: The contractor shall provide engineering support to assist NASA in its responsibility to develop the OMRSD, ATP, and Operations Manual for the GSE Integration Testbed. (WBS 1.8.1.3) (Milestone 32)</i></p> <p>The USTDC will provide engineering support to assist NASA in its responsibility to develop an OMRSD, ATP, and Operations Manual for the GSE Integration Testbed utilizing formats approved by the Task Order Manager and the project team. The OMRSD, ATP, and Operations Manual will be reviewed and accepted by the project team.</p> <p><i>Tasks 803 and 804: The contractor shall provide engineering and technician support to assist NASA in its responsibility to perform verification testing per the GSE Integration Testbed ATP. (WBS 1.8.2.1) (Milestone 32)</i></p> <p><i>The contractor shall provide engineering support to assist NASA in its responsibility to perform the GSE - Integration Testbed System Acceptance Review. (WBS 1.8.2.2) (Milestone 32)</i></p> <p>Upon completion of the GSE Integration Testbed installation, the USTDC will provide engineering and technician support to assist NASA in its responsibility to perform verification testing per the GSE Integration Testbed ATP. As part of the system activation, a system acceptance review will be held by the LETF project team to formally acknowledge that the system performance meets requirements specified in the GSE Integration Testbed SRD and is ready for operations.</p> <p><i>Task 900: Retractable Support Post (RSP) Test Fixture Development (WBS 1.9)</i></p> <p><i>Task 901: The contractor shall develop an RSP Test Fixture Operational Concepts Document. (WBS 1.9.1.1) (Milestone 35)</i></p> <p>The USTDC will develop an RSP Test Fixture Operational Concepts Document similar to the VMS Operational Concepts Document. The document will be developed utilizing inputs from the LETF project team, NASA NE, and NASA GRC. The Operational Concepts Document will be used as a guide in developing the RSP Test Fixture SRD.</p> <p><i>Task 902: The contractor shall develop an RSP Test Fixture System Requirements Document. (WBS 1.9.1.3) (Milestone 36)</i></p> <p>The USTDC will develop the RSP Test Fixture SRD similar to the VMS SRD. The SRD will be developed utilizing the same format as the VMS SRD. The SRD will be developed with inputs from the LETF project team, NASA NE, and NASA GRC. The SRD will be reviewed and approved by the LETF project team and NASA NE. The SRD will be used to develop the RSP Test Fixture PWS.</p> <p><i>Task 903: The contractor shall develop an RSP Test Fixture Performance Work Statement. (WBS 1.9.1.5) (Milestone 37)</i></p> <p>The USTDC will develop the RSP Test Fixture PWS similar to the VMS PWS. The PWS will be developed utilizing the same format as the VMS PWS. The PWS will be developed with inputs from the LETF project team, NASA NE, and NASA GRC. The PWS will be reviewed and approved by the LETF project team. The PWS will be used to solicit bids from subcontractors to perform the design, fabrication, installation, and checkout of the RSP Test Fixture to be added with a future Task Order Revision.</p> <p style="text-align: center;"><u>D. BASIS OF ESTIMATE</u></p>		

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<p>The labor classifications for this Task Order were chosen to provide the range of skills and experience that are the minimum necessary for the successful completion of the planned work effort. Senior level resources have been planned on this Task Order for complex engineering tasks that require systems expertise.</p> <p>Tasks 101, 102, 301, 302, 801, 802, 803, and 804: The estimate for these tasks is based on the requested amount of support in each of the areas of expertise and the relative cost. NASA and USTDC partnered through meetings, during September 2008, to arrive at the planned effort estimate. The estimate for the procurement portion of task 301 is based on the history of performing similar procurement tasks on USTDC Task Order 6SPI00335, LETF Constellation Program Support, during fiscal year 2008. The estimate is attached.</p> <p>Tasks 201, 202, 204, and 205: The estimate for these tasks is based on history of performing similar electrical installation tasks on USTDC Task Orders 6MMS00033, LETF O & M, and 6SPI00335, LETF Constellation Program Support, during fiscal year 2008. The resources to perform this work were selected based on their expertise and knowledge of the LETF electrical infrastructure, KSC standards, and electrical equipment installation. The estimate is attached.</p> <p>Tasks 203 and 314.1 (TP Rev C) : The estimate for these tasks is based on history of performing similar grounding installation tasks on USTDC Task Orders 6MMS00033, LETF O & M, and 6SPI00335, LETF Constellation Program Support, during fiscal year 2008. The resources to perform this work were selected based on their expertise and knowledge of the LETF infrastructure, KSC standards, and electrical grounding equipment installation. The estimate is attached.</p> <p>Tasks 206 and 207: The estimate for these tasks is based on history of performing similar instrumentation equipment installation tasks on USTDC Task Order 6MMS00311, Mechanical, Structural, and Controls Development Shop Infrastructure, during fiscal year 2008. The resources to perform this work were selected based on their expertise and knowledge of the LETF Control Room and instrumentation systems. The estimate is attached.</p> <p>Task 208: The estimate for this task is based on history of performing similar disassembly tasks on USTDC Task Order 6SPI00335, LETF Constellation Program Support, during fiscal year 2008. The resources to perform this work were selected based on their expertise and knowledge of the LETF infrastructure, heavy equipment operations, and experience with disassembly and refurbishment projects. The estimate is attached.</p> <p>Tasks 209 and 210: The estimates for these tasks are based on history of performing similar disassembly tasks on USTDC Task Order 6SPI00335, LETF Constellation Program Support, during fiscal year 2008. The resources to perform this work were selected based on their expertise and knowledge of the LETF infrastructure, heavy equipment operations, and experience with disassembly and refurbishment projects. The estimate is attached.</p> <p>Task 211: The estimate for this task is based on history of performing similar lighting installation tasks on USTDC Task Order 6SPI00335, LETF Constellation Program Support, during fiscal year 2008. The resources to perform this work were selected based on their expertise and knowledge of the LETF electrical infrastructure, KSC standards, and lighting installation. The estimate is attached.</p> <p>Task 212: The estimate for this task is based on history of performing similar electrical system layout tasks on USTDC Task Order 6SPI00335, LETF Constellation Program Support, during fiscal year 2008. The</p>		

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<p>resources to perform this work were selected based on their expertise and knowledge of the LETF electrical infrastructure, KSC standards, and electrical and lighting installation. The estimate is attached.</p> <p>Task 302: The estimate for this task is based on history of performing similar electrical installation tasks on USTDC Task Orders 6MMS00033, LETF O & M, and 6SPI00335, LETF Constellation Program Support, during fiscal year 2008. The resources to perform this work were selected based on their expertise and knowledge of the LETF electrical infrastructure, KSC standards, and electrical equipment installation. The estimate is attached.</p> <p>Tasks 303, 305, 312, 313, and 314: The estimate for these tasks is based on history of performing similar equipment installation tasks on USTDC Task Order 6MMS00033, LETF O & M, during fiscal year 2008. The resources to perform this work were selected based on their expertise and knowledge of the LETF infrastructure, test fixture equipment, hydraulic systems and experience with equipment installation tasks. The estimate is attached.</p> <p>Tasks 304 and 307: The estimate for these tasks is based on history of performing similar tasks on USTDC Task Order 6SPI00335, LETF Constellation Program Support, during fiscal year 2008. The resources to perform this work were selected based on their expertise and knowledge of the VMS requirements, creating performance work statements, and overseeing subcontractor tasks. The estimate is attached.</p> <p>Task 306: The estimate for this task is based on history of performing similar system operational checkout tasks on USTDC Task Order 6MMS00033, LETF O & M, during fiscal year 2008. The resources to perform this work were selected based on their expertise and knowledge of the LETF infrastructure and the VMS Water Cooling System requirements. The estimate is attached.</p> <p>Tasks 308 through 311: The estimate for this task is based on history of performing similar cable fabrication and installation tasks on USTDC Task Orders 6MMS00049, LETF Shuttle Operations Test Support, and 6SPI00335, LETF Constellation Program Support, during fiscal year 2008. The resources to perform this work were selected based on their expertise and knowledge of KSC standards, cable fabrication and installation, and control systems. The estimate is attached.</p> <p>Task 313.1: The estimate for this task is based on history of performing similar controls integration tasks for the GSE Integration Testbed on USTDC Task Order 7SPI00335, LETF Constellation Program Support, during fiscal year 2009. The resources to perform this work were selected based on their expertise and knowledge of Programmable Logic Controllers (PLC) and the VMS and LETF control requirements. The estimate is attached. (TP Rev C)</p> <p>Task 315: The estimate for this task is based on history of performing similar OMRSD, ATP, and Operation Manual development tasks on USTDC Task Order 5MMS00033, LETF O & M, and 5CIS00051, Controls Integration, during fiscal year 2007. The resources to perform this work were selected based on their expertise and knowledge of the LETF infrastructure and the Vehicle Motion Simulator. The estimate is attached.</p> <p>Task 316: The estimate for this task is based on history of performing similar verification tasks on USTDC Task Order 5CIS00051, Controls Integration, during fiscal year 2007. The resources to perform this work were selected based on their expertise and knowledge of the LETF VMS requirements and system testing experience. The estimate is attached.</p>		

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<p>Tasks 508 through 512: The estimate for these tasks is based on history of performing similar electronic equipment installation tasks on USTDC Task Order 5MMS00311, Mechanical, Structural, and Controls Development Shop Infrastructure, during fiscal year 2007. The resources to perform this work were selected based on their expertise and knowledge of the LETF Control Room and video systems. The estimate is attached.</p> <p>Task 516: The estimate for this task is based on history of performing similar OMRSD, ATP, and Operation Manual development tasks on USTDC Task Order 5MMS00033, LETF O & M, and 5CIS00051, Controls Integration, during fiscal year 2007. The resources to perform this work were selected based on their expertise and knowledge of the LETF Control Room and video systems. The estimate is attached.</p> <p>Tasks 601 through 608: The estimate for these tasks is based on history of performing similar hazard and gas detection equipment fabrication, assembly, and installation tasks on USTDC Task Order 5CIS00187, Hazardous Gas Detection Applications, during fiscal year 2007. The resources to perform this work were selected based on their expertise and knowledge of the LETF Control Room, hazard and gas detection systems, KSC standards, cable fabrication and installation, and equipment and panel fabrication. The estimate is attached.</p> <p>Task 609: The estimate for this task is based on history of performing similar OMRSD, ATP, and Operation Manual development tasks on USTDC Task Order 5MMS00033, LETF O & M, and 5CIS00051, Controls Integration, during fiscal year 2007. The resources to perform this work were selected based on their expertise and knowledge of the LETF Control Room and hazardous gas detection systems. The estimate is attached.</p> <p>Tasks 701 and 702: The estimate for these tasks is based on history of performing similar cryogenic equipment installation tasks on USTDC Task Orders 4MMS00049, LETF Shuttle Operations Test Support, during fiscal year 2006 and 5KCF00063, Cryogenic Test Lab Infrastructure and O & M, during fiscal year 2007. The resources to perform this work were selected based on their expertise and knowledge of cryogenic equipment and component installations. The estimate is attached.</p> <p>Task 703: The estimate for this task is based on history of performing similar fabrication drawing development tasks on USTDC Task Order 6SPI00335, LETF Constellation Program Support, during fiscal year 2008. The resources to perform this work were selected based on their knowledge of the LETF Cryogenic System and fabrication drawing development. The estimate is attached.</p> <p>Task 704: The estimate for this task is based on history of performing similar pipe and pipe stand fabrication tasks on USTDC Task Order 4MMS00345, Black Powder Coalescing Filter Testing, during fiscal year 2006. The resources to perform this work were selected based on their expertise and knowledge of welding and pipe fitting. The estimate is attached.</p> <p>Tasks 705 and 706: The estimate for these tasks is based on history of performing similar pipe, pipe stand, and component installation tasks on USTDC Task Order 4MMS00345, Black Powder Coalescing Filter Testing, and 4MMS00049, LETF Shuttle Operations Test Support, during fiscal year 2006. The resources to perform this work were selected based on their expertise and knowledge of cryogenic piping and component installations and welding and pipe fitting. The estimate is attached. The estimate for the pipe stand foundations installation task is based on history of performing similar foundation installation tasks on USTDC Task Order 7SPI00335, LETF Constellation Program Support, during fiscal year 2009. The resources to perform this work were selected based on their expertise and knowledge of the Cryogenic System requirements, creating performance work statements, and overseeing subcontractor tasks.</p>		

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Task 706.1: The estimate for this task is based on history of performing similar instrumentation installation tasks on USTDC Task Order 4MMS00049, LETF Shuttle Operations Test Support, during fiscal year 2008. The resources to perform this work were selected based on their expertise and knowledge of data acquisition systems and instrumentation installation. The estimate is attached.

Task 707: The estimate for this task is based on history of performing similar fabrication and installation drawing development tasks on USTDC Task Order 6SPI00335, LETF Constellation Program Support, during fiscal year 2008. The resources to perform this work were selected based on their expertise and knowledge of the LETF infrastructure and purge systems. The estimate is attached.

Tasks 708 through 712: The estimate for these tasks is based on history of performing similar purge system component fabrication and installation tasks on USTDC Task Order 5MMS00033, LETF O & M, during fiscal year 2007. The resources to perform this work were selected based on their expertise and knowledge of the LETF infrastructure and purge systems. The estimate is attached.

Task 713: The estimate for this task is based on history of performing similar OMRSD, ATP, and Operation Manual development tasks on USTDC Task Order 5MMS00033, LETF O & M, and 5CIS00051, Controls Integration, during fiscal year 2007. The resources to perform this work were selected based on their expertise and knowledge of the LETF infrastructure and cryogenic systems. The estimate is attached.

Task 714: The estimate for this task is based on history of performing similar purge system component fabrication and tasks on USTDC Task Order 5MMS00033, LETF O & M, during fiscal year 2008. The resources to perform this work were selected based on their expertise and knowledge of the LETF infrastructure and purge systems. The estimate is attached. (TP Rev B)

Tasks 901, 902, and 903: The estimates for these tasks are based on history of performing similar document development tasks on USTDC Task Order 6SPI00335, LETF Constellation Program Support, during fiscal year 2007. The resources to perform this work were selected based on their expertise and knowledge of the LETF infrastructure, KSC requirements, and requirements documentation development. The estimate is attached.

ODC Statement: Total (TP Rev C)

will be used to complete the subcontract for the development of a six degree-of-freedom Vehicle Motion Simulator (VMS) per the Performance Work Statement for Vehicle Motion Simulator (VMS) at the NASA Kennedy Space Center. The performance work statement is attached. This estimate is based on the actual final approved proposal. This contract was competitively bid between three companies and MTS Systems Corporation was selected as the vendor. The contract has been divided into five phases, design, materials, fabrication, checkout, and installation oversight. The total of this subcontract is As of September 30, 2008, the design phase is complete and the most of the materials phase is complete. Payments to date equal The MTS VMS proposal is attached.

(TP Rev C) will be used to procure the installation option of the current Vehicle Motion Simulator (VMS) design and fabrication subcontract. The proposal is attached. The increased estimate includes performing all installation options as specified in the VMS Performance Work Statement, Revision H, based on updated vendor quote. (TP Rev C)

will be used to purchase an electrical equipment enclosure and associated hardware required to complete the LETF Cryogenic Control System. This estimate is based on the vendor's quotation.

1. DOCUMENT NO(S) TO Ref: SPI TO No.: 00335 TO Rev: C Plan Rev: C	<div style="text-align: center;"> Kennedy Space Center Document Continuation Sheet </div>	2. Page 21 of 23
4. DOCUMENT: Title: LETF Constellation Program Support		3. OFFICE: 5. DATE:

will be used to purchase temperature transducers and associated hardware required to complete the LETF Cryogenic Control System. This estimate is based on the vendor's quotation.

will be used for 4 trips to the Glenn Research Center as part of the VMS engineering support. This estimate is based on five-day travel to Cleveland , Ohio (Glenn Research Center) to include round trip airfare from Orlando , 4 nights lodging, 4 day rental car, plus per diem and miscellaneous expenses. Each trip estimated at \$ This estimate is based on internet searches and current Government per diem rates.

will be used to subcontract the VMS foundation modifications required to install the VMS. This estimate is based on quotations received for similar foundation work for the LETF Cryogenic System dewars. The quotations received averaged approximately \$. The VMS foundation cost has been extrapolated based on size and complexity.

will be used to subcontract the installation of the VMS Cooling Water System and DAS terminal distributor foundations. This estimate is based on quotations received for similar foundation work for the LETF Cryogenic System dewars. The quotations received averaged approximately \$. The VMS Cooling Water System and DAS terminal distributor foundation cost has been extrapolated based on size and complexity.

will be used to subcontract the installation of the VMS and Cryogenic System concrete trenches required for the installation of the VMS hydraulic lines and the Cryogenic System piping. This value is based on a detailed estimate performed by a USTDC professional estimator with extensive construction estimating experience. Estimating references include NASA historical data, KSC specification G-0003 and G-0002, TR-1511, KSC Estimating and Cost Engineering Handbook, NASA Desk Reference Book, current vendor quotes, R. S. Means 2008, and Richardson's 2008. The estimate is attached.

will be used to purchase materials for the VMS ancillary systems being designed by NASA GRC. will be used for the Water Cooling System. will be used for the Pump House Ventilation System. will be used for VMS facility electrical equipment. These systems are in the design stage and specific materials have not been identified. These values are based on a Rough Order Magnitude (ROM) estimate performed by the design team at NASA GRC with extensive experience in developing similar systems. The estimate is attached.

will be used to purchase Keyboard Video Mouse (KVM) equipment required for the implementation of the LETF Control Room. This estimate is based on the manufacturer's quotation. The quotation is attached.

will be used to purchase components needed to complete the fabrication and installation of the GN2 distribution panels required for the LETF Purge System. The estimate is based on vendor quotations. The quotations are attached.

will be used to purchase components needed to complete the fabrication and installation of the GHe distribution panel required for the LETF Purge System. The estimate is based on vendor quotations. The quotations are attached.

will be used to purchase three Data Acquisition System computers to be installed in the LETF Control Room required for the LETF Data Acquisition System. The Mechanical, Structural and Controls Development Shop has obtained a waiver (#08-0721-03) for the purchase of IT equipment for non-ODIN

1. DOCUMENT NO(S) TO Ref: SPI TO No.: 00335 TO Rev: C Plan Rev: C	Kennedy Space Center Document Continuation Sheet	2. Page 22 of 23
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		5. DATE:

computers, issued by the NASA KSC CIO, approved on 07/28/08. The LETF Control Room is part of the Data Acquisition System Laboratory which is covered by this waiver. The waiver is attached. The estimate is based on a vendor quotation. The quotation is attached.

will be used to subcontract the Cryogenic System pipe stand foundations required to complete the Cryogenic System installation. This estimate is based on a quotation of for similar foundation work for the VMS Cooling Tower and DAS terminal distributor foundations. The Cryogenic System pipe stand foundations are approximately four times the size of the VMS Cooling Tower and DAS terminal distributor foundations. The e-mail quotation is attached.

will be used for crane rental required for removal of the Centaur Rolling Beam Porch structure. The estimate is based on an internet quotation. The quotation is attached.

will be used to purchase PLC control components required for the VMS. The estimate is based on vendor quotations. The quotations are attached.

will be used to purchase electrical components required for the VMS Water Cooling System and the Pump House Ventilation System. The estimate is based on vendor quotations. The quotations are attached.

will be used for crane rental required for the East and North Tower demolition activities. The estimate is based on an internet quotation. The quotation is attached.

will be used to purchase PLC control components required for the LETF Cryogenic System. The estimate is based on vendor quotations. The quotation is attached. (TP Rev C)

E. STANDARDS OF PERFORMANCE (METRICS)

1. - Task Order metrics will be collected in accordance with the USTDC Internal Surveillance Plan.

F. RISK ASSESSMENT

Risk #1: Safety: RAC 8 (Yellow) (4/2/Near term). LETF installation activities involve hazardous operations including mobile crane and high reach operations. Heavy equipment, high pressures and other hazardous operations could cause an impact that may result in injuries or property damage. Mitigation: Team members attend regular safety meetings, receive required training and use approved operating procedures. USTDC Safety and Quality personnel monitor hazardous operations. Risk Response: Mitigate.

Risk #2: Environmental: RAC 6 (Green) (3/2/Near term). LETF installation activities involve connection of hydraulic components. This situation could result in a hydraulic spill that would possibly contaminate surrounding soil and water. Mitigation: Team members are experienced with handling hydraulic components. Team members are also trained on spill containment and cleanup. The LETF has trained Hazardous Waste Monitors and the S & MA Environmental Engineer will be contacted if any spill occurs. Risk Response: Mitigate.

Risk #3: Cost: RAC 16 (Red) (4/4/Near term): Funding for FY09 S & MA support for this task order has been removed. If S & MA support funding is not added to another USTDC Task Order, this could result in a work stoppage. Mitigation: If funding does not materialize on another USTDC Task Order, scope will be reduced from current tasks and will be shifted to add S & MA support for FY09. Risk Response: Mitigate. (TP Rev C)

1. DOCUMENT NO(S) TO Ref: SPI TO No.: 00335 TO Rev: C Plan Rev: C	<div style="text-align: center;"> Kennedy Space Center Document Continuation Sheet </div>	2. Page 23 of 23
4. DOCUMENT: Title: LETF Constellation Program Support		3. OFFICE: 5. DATE:
<p>Risk #4: Safety: RAC 8 (Yellow) (4/2/Near term). Centaur Rolling Beam Porch structure removal and demolition of the East and North Towers involves hazardous operations including mobile crane and high reach operations that could potentially result in injuries or property damage. Mitigation: Team members attend regular safety meetings, receive required training, and use approved operating procedures. USTDC S & MA personnel monitor hazardous operations. Risk Response: Mitigate</p> <p>Risk #5: Safety: RAC 4 (Green) (4/1/Near term). Installation of electrical hardware involves working in proximity of high voltages that could potentially create shock hazards. Mitigation: Team members attend regular safety meetings, receive required training, utilize lock out / tag out procedures, and use approved personal protection equipment. Risk Response: Mitigate</p> <p>The Risk Assessments have been reviewed. Scope and funding has been added to Task Order 485 to perform LETF S & MA tasks. This action removes the risk of a work stoppage. Therefore, Risk #3 has been deleted. All other risks remain valid. (TP Rev C)</p> <p style="text-align: center;"><u>G. OTHER PERTINENT INFORMATION</u></p> <p>S & MA Statement:</p> <p>USTDC S & MA support will be required during LETF disassembly and refurbishment activities and during activation and validation testing which will be identified on the appropriate Work Authorization Control instructions.</p> <p>U STDC S & MA support will be required for all LETF system designs. These tasks are funded by USTDC Task Order 6SPI00485, S & MA Products to CxP Subsystem Development.</p> <p>University Affiliation: No University Affiliation has been initially planned; as the Task Order progresses, the opportunity for University Affiliation will be re-evaluated.</p> <p>NTR: No New Technology Reports are expected to be generated by this Task Order.</p> <p>Export Control Compliance: All documents prepared and/or received under this Task Order will be reviewed for Export Control requirements. Documents not properly marked will be processed using the appropriate administrative and management controls.</p> <p>Success Story: A Success Story will be written by the USTDC Task Order lead at the conclusion of this project.</p> <p>IT Security: Software and computers for systems at the LETF will be maintained per the USTDC IT Security Plan, USTDC-SOP-5. 1 through 5.19. This activity is provided by USTDC Task Order 7MMS00311, Mechanical, Structural, and Controls Development Shop Infrastructure.</p> <p>OCI Statement: Organizational Conflict-of-Interest (OCI) waiver and Non-Disclosure Agreement (NDA) will be obtained prior to the award of any subcontract in order to preclude any OCI. The OCI Assessment has been reviewed and remains valid. (TP Rev C)</p>		



USTDC TASK ORDER PLAN (J5)
SUMMARY

Task Order # 00335 Rev: C Title: LETF Constellation Program Support
Contract Yr. 7 Plan Rev: C

Current Contract Year

	CY1-5	CY6	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total	CY8	CY9	From	Delta	Grand Totals
--	-------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-------	-----	-----	------	-------	--------------

ASRC Labor	
Sierra Lobo Labor	
Labor Sub-Total	
Total Labor Hours	
Sub-Con. G&A Adj	
M&A Adj	
ODC G&A Adj	
Adj. Labor Total	
Consultants	
ODC	
Adj. ODC Total	
Subtotal Est. Cost	
Award Fee	
Incentive Fee	
Total Cost & Fee	

24,123,914 526,000 24,649,915

Approval For Task Order Number: 00335 C
USTDC Business Office
Cummins, Martin
05/18/09

Order #: 00335

[illegible]

05/18/09
Cummins, Martin

Task Order#: 00335		CY: 7	Rev: C	Plan Rev: C	USTDC Task Order Plan Detail (A-SRC)																
Labor Costs	CY7 Rate	CY1-5	CY6	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total	CY8	CY9	From	Delta	Totals
Director																					
Electrical Engineer II																					
Electrical Engineer IV																					
Electrical Engineer V																					
Electrical Technician II																					
Electrical Technician III																					
Engineer II																					
Engineer III																					
Engineer IV																					
Engineer V																					
Engineering Aide I																					
Engineering Aide III																					
Engineering Designer																					
Engineering Designer																					
Engineering Designer																					
Engineering Designer																					
Manager																					
Mechanical Engineer II																					
Mechanical Engineer III																					
Mechanical Engineer																					
Mechanical Engineer V																					
Mechanical Technician																					
Mechanical Technician																					
Mechanical Technician																					
Mechanical Technician																					
Hydraulic Systems																					
Mechanic																					
Principal Investigator																					
Project Manager III																					
Project Manager IV																					
Sr. Project Manager																					
Supervisor																					
Technical Editor																					
Telecommunications																					
Engineer IV																					
ASRC Labo.																					

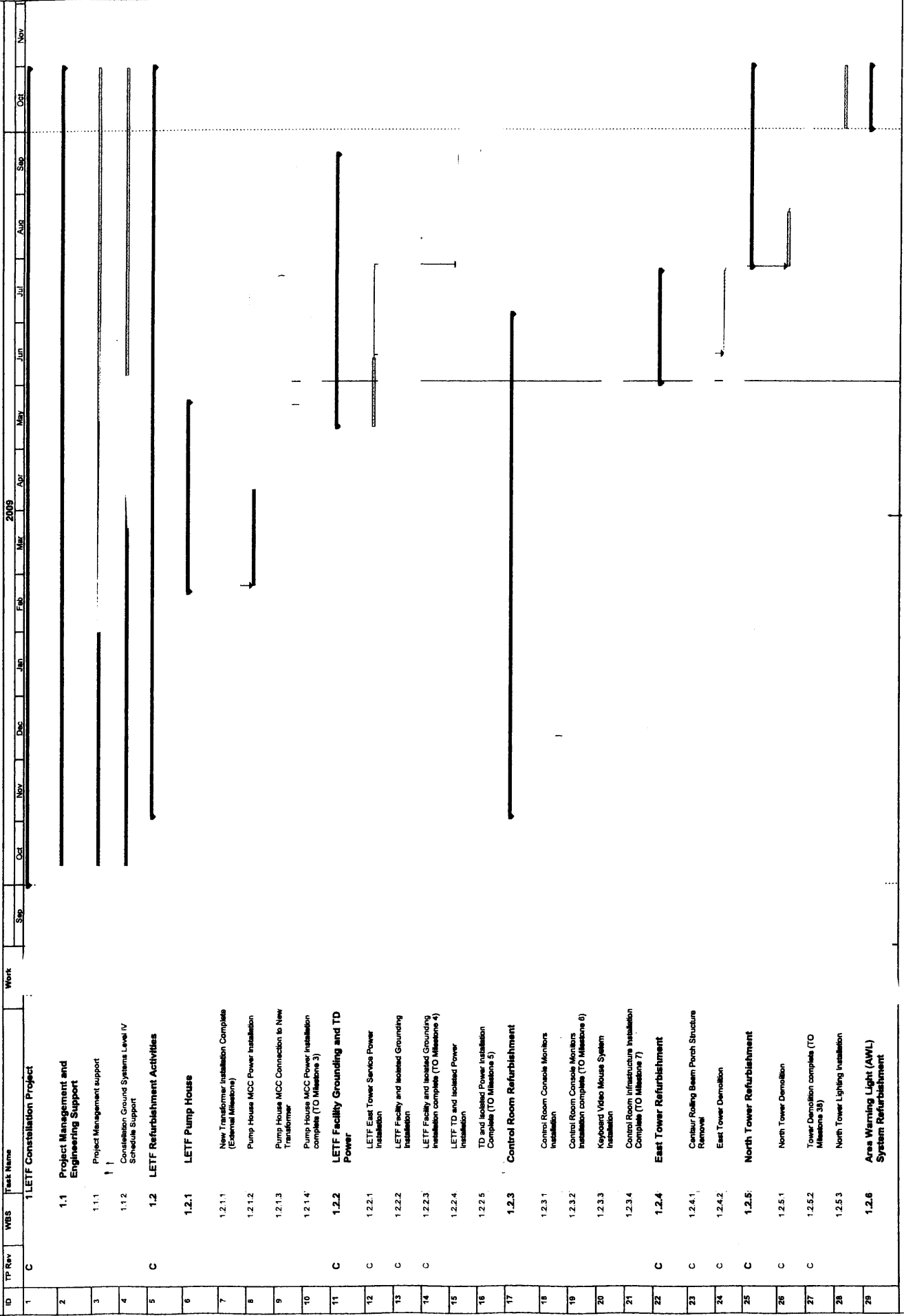
Projected ODC	CY1-5	CY6	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total	CY8	CY9	From	Delta	Totals
ODC																				
Consultants																				
ODC Sub-Total																				

USTDC Business Office
 TO: 00335 CY7 C
 Cummins, Martin
 05/18/09

Task Order#: 00335				CY: 7	Rev: C	Plan Rev: C	USTUC Task Order Plan Detail (Sierra Lobo)														
Productive Man-Hours																					
WYE	CY1-5	CY6	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total	CY8	CY9	From	Delta	Totals	
Engineer IV																					
Millwright																					
Subject Matter Expert																					
Total WYE:																					
Labor Hours	CY1-5	CY6	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total	CY8	CY9	From	Delta	Totals	
Engineer IV																					
Millwright																					
Subject Matter Expert																					
Total Hr																					
Labor Costs	CY7 Rate	CY1-5	CY6	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total	CY8	CY9	From	Delta	Totals
Engineer IV																					
Millwright																					
Subject Matter Expert																					
Sierra Lobo Lab																					
Projected ODC	CY1-5	CY6	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total	CY8	CY9	From	Delta	Totals	
ODC																					
Consultants																					
ODC Sub-Total																					

USTDC Business Office
TO: 00335 CY7 C
Cummins, Martin
05/18/02

LETF CONSTELLATION PROGRAM SUPPORT



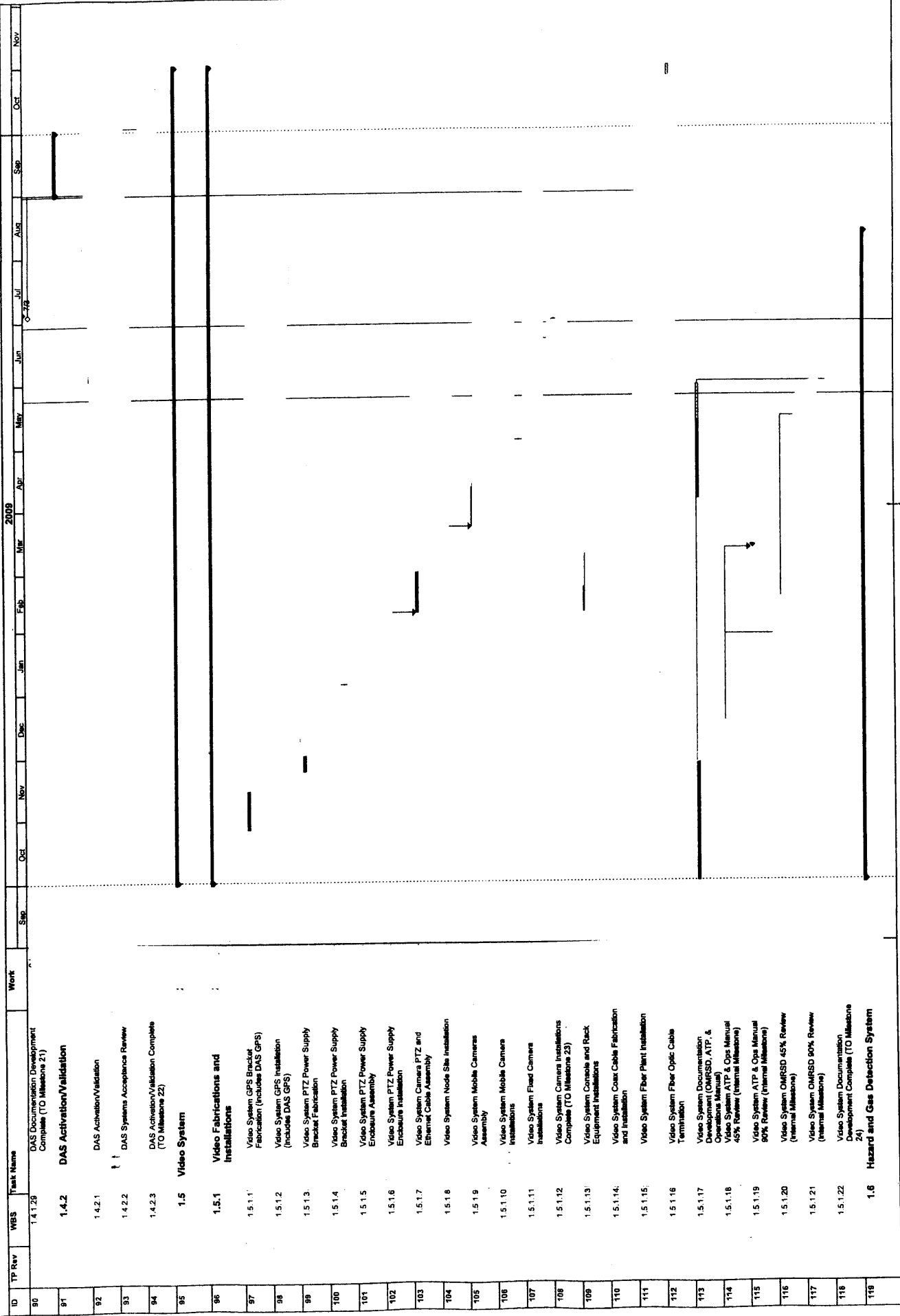
LETF CONSTELLATION PROGRAM SUPPORT

ID	TP	Rev	WBS	Task Name	Work	2009	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
30			1.2.6.1	AVL System Preliminary Layout													
31	C		1.3	Vehicle Motion Simulator (VMS)													
32			1.3.1	VMS Fabrications/Installations													
33			1.3.1.1	Engineering Support													
34	C		1.3.1.2	VMS Hydraulic Pumps Installation Complete (Internal Milestone)													
35	C		1.3.1.3	VMS HPS Final Electrical Hookup													
36	C		1.3.1.4	Pump House Ventilation System Installation													
37			1.3.1.5	VMS Cooling Tower Foundation Installation													
38			1.3.1.6	VMS Cooling Tower Foundation Installation Complete (TO Milestone 9)													
39	C		1.3.1.7	VMS Cooling Water System Installation													
40	C		1.3.1.8	VMS Cooling Water System Checkout													
41	C		1.3.1.9	VMS Cooling Water System Installation Complete (TO Milestone 10)													
42			1.3.1.10	VMS Foundation Procurement Support													
43			1.3.1.11	VMS Foundation Modification Support (Subcontract)													
44			1.3.1.12	VMS Foundation Modification Complete (TO Milestone 11)													
45			1.3.1.13	VMS Cable Fabrication Drawings													
46			1.3.1.14	VMS Cable Fabrication Drawings Complete (TO Milestone 12)													
47			1.3.1.15	VMS Cable Fabrication - Sensor End													
48	C		1.3.1.16	VMS Mass Connector Storage Fabrication and Installation													
49			1.3.1.17	VMS Cable Tray Installation													
50			1.3.1.18	VMS Cable Installation													
51			1.3.1.19	VMS E-Stop / Pendant Installation													
52			1.3.1.20	VMS Watchdog System Installation													
53			1.3.1.21	VMS System Delivered to KSC (Internal Milestone)													
54			1.3.1.22	VMS System Installation													
55	C		1.3.1.23	VMS/LETF Control Integration													
56	C		1.3.1.24	VMS Bonding and Grounding													
57			1.3.1.25	VMS Documentation Development (OMRSD, ATP, & Operations Manual)													
58			1.3.2	VMS System Activation/Validation													
59			1.3.2.1	VMS MTS Verification Testing													

LETF CONSTELLATION PROGRAM SUPPORT

ID	TP Rev	WBS	Task Name	Work	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
60		1.4	Data Acquisition System (DAS)																
61		1.4.1	DAS Fabrications and Installations																
62		1.4.1.1	DAS Cable Fabrication																
63		1.4.1.2	DAS Cable Fabrication Complete (TO Milestone 13)																
64		1.4.1.3	DAS Terminal Distributor Fabrication																
65		1.4.1.4	DAS Terminal Distributor Fabrication Complete (TO Milestone 14)																
66		1.4.1.5	DAS Terminal Distributor Foundation Installation (Subcontract)																
67		1.4.1.6	DAS Terminal Distributor Installation																
68		1.4.1.7	DAS Terminal Distributor Installation Complete (TO Milestone 15)																
69		1.4.1.8	DAS TD Cable Tray Installation																
70		1.4.1.9	DAS TD Trench Cable Tray Installation Complete (TO Milestone 16)																
71		1.4.1.10	DAS TD Cable Tray Installation Complete (TO Milestone 16)																
72		1.4.1.11	DAS Cable Installation																
73		1.4.1.12	DAS 1199 Cabinet Array Panel Installation																
74		1.4.1.13	DAS 1199 Cabinet Array Panel Installation Complete (TO Milestone 17)																
75		1.4.1.14	DAS High Speed Buses Assembly																
76		1.4.1.15	DAS High Speed Buses Checkout																
77		1.4.1.16	DAS High Speed Buses Checkout Complete (TO Milestone 18)																
78		1.4.1.17	DAS Excitation Panels Fabrication and Assembly																
79		1.4.1.18	DAS Excitation Panels Installation																
80		1.4.1.19	DAS Excitation Panels Installation Complete (TO Milestone 19)																
81		1.4.1.20	DAS Software Development																
82		1.4.1.21	DAS NIPXI Hardware Installation																
83		1.4.1.22	DAS Computer Installation																
84		1.4.1.23	DAS Installation Complete (TO Milestone 20)																
85		1.4.1.24	DAS Documentation Development (OMRSD, ATP, & Operations Manual)																
86		1.4.1.25	DAS OMRSD 45% Review (Internal Milestone)																
87		1.4.1.26	DAS OMRSD 90% Review (Internal Milestone)																
88		1.4.1.27	DAS ATP & Ops Manual 45% Review (Internal Milestone)																
89		1.4.1.28	DAS ATP & Ops Manual 90% Review (Internal Milestone)																

LEIF CONSTELLATION PROGRAM SUPPORT



LEIF CONSTELLATION PROGRAM SUPPORT

ID	TP Rev	WBS	Task Name	Work	2009	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
120	C	1.6.1	Haz Gas Fabrications/Installations													
121		1.6.1.1	Haz Gas Fire & Leak Detector Distribution Box Wiring													
122		1.6.1.2	Haz Gas Fire & Leak Detector Bracket and Stand Fabrication													
123		1.6.1.3	Haz Gas Fire & Leak Detector TD Fabrication													
124		1.6.1.4	Haz Gas Fire & Leak Detector Fabrications Complete (TO Milestone 25)													
125		1.6.1.5	Haz Gas Fire & Leak Detector Cable Delivery (External Milestone)													
126	C	1.6.1.8	Haz Gas Fire & Leak Detector Cable Fabrication													
127	C	1.6.1.7	Haz Gas Fire & Leak Detector TD Installation													
128	C	1.6.1.8	Haz Gas Fire & Leak Detector PLC Hardware Installation													
129	C	1.6.1.9	Haz Gas Fire & Leak Detector Cable Installation													
130	C	1.6.1.10	Haz Gas Fire & Leak Detector Installation													
131	C	1.6.1.11	Fire & Leak Detector Installation Complete (TO Milestone 28)													
132		1.6.1.12	Haz Gas Documentation (OMRSD, ATP, & Operations Manual)													
133		1.6.1.13	Haz Gas OMRSD 45% Review (Internal Milestone)													
134		1.6.1.14	Haz Gas OMRSD 90% Review (Internal Milestone)													
135		1.6.1.15	Haz Gas ATP & Ops Manual 45% Review (Internal Milestone)													
136		1.6.1.16	Haz Gas ATP & Ops Manual 90% Review (Internal Milestone)													
137		1.6.1.17	Haz Gas Documentation Complete (TO Milestone 27)													
138	C	1.7	Cryogenic System													
139	C	1.7.1	Cryogenic & Purge System Fabrication and Installation													
140		1.7.1.1	Cryogenic System Fabrication and Installation													
141		1.7.1.1.1	Cryo System Drier Re-work													
142		1.7.1.1.2	Cryo System Dewar Installation Complete (TO Milestone 33)													
143		1.7.1.1.3	Cryo System Vent Stack Fabrication													
144		1.7.1.1.4	Cryo System Pipe Stand Fabrication Drawings													
145		1.7.1.1.5	Cryo System Piping & Pipe Stand Fabrication													
146		1.7.1.1.6	Cryo System Pipe Stand Foundation Installation (Subcontract)													
147		1.7.1.1.7	Cryo System Piping & Pipe Stand Installation													
148		1.7.1.1.8	Cryo System Component Installation													
149		1.7.1.1.9	Cryo System Instrumentation Installation													

**University-affiliated Spaceport Technology Development Contract (USTDC)
Combination Pre-Negotiation/Price Negotiation Memorandum****Title – LETF Constellation Program Support****Description**

The task order is to support the project formulation, disassembly and refurbishment phase for upgrade of the Launch Equipment Test Facility (LETF) in support of the Constellation Program. Additionally, the contractor will provide systems engineering and integration, safety engineering, environmental engineering, design development for LETF systems, multiple disassembly, and fabrication and assembly tasks.

The purpose of this revision is to add scope to perform the Vehicle Motion Simulator (VMS) static and motion structures grounding and bonding, VMS mass connector stowage fabrication and installation, and VMS/LETF facility controls integration. This Revision also add scope to provide the capability for the integration of the LETF Cryogenic System controls as specified in the LETF Cryogenic System design. NASA LX has shifted the LETF Operational Readiness Data (ORD) and has updated the project schedule accordingly. This Revision updates the Task Order project schedule to match the NASA LX schedule and align the project milestones.

The Task Order Plan and ASRC's final cost proposal is the result of a partnering process undertaken between the contractor and the Government to arrive at a fair and reasonable technical approach, skill mix, necessary ODC's, and the associated costs. This memorandum details the resultant change in the task order value as a result of this procurement action.

Participants

Contracting Officer – Joyce McDowell/OP-ES
NASA Task Order Manager – Eric Ernst/NE-D1

CTM – Meredith Chandler/NE-12
USTDC Lead – J. Dean
USTDC TOM – Paul Gamble

Status of Contractor Systems

ASRC's Accounting system has been determined to be adequate for the accumulation, reporting and billing of costs under government contracts. (Reference DCAA Audit Report No. 6311-2005D17740010, dated March 30, 2005.) The Billing system has also been determined to be adequate for billing costs accumulated under government contracts. (Reference DCAA Audit Report No. 6311-2005D17740011, dated April 6, 2005.) A Purchasing system review was performed by NASA/KSC and determined ASRC's purchasing policies and practices to be adequate for protecting the Government's interest. (Reference Contractor Purchasing System Review, dated August 27, 2008).

Certificate of Current Cost or Pricing Data

A certificate of current cost or pricing data is not required at this dollar value.

Cost Elements**Labor**

The total proposed adjusted target labor cost of the work associated with the subject task order is increased by _____ for a revised task order value of _____. The labor classifications and rates proposed by ASRC are in compliance with contract clause B.6, Task Order Pricing. The NASA Task Order Manager (TOM) has reviewed ASRC's proposed task order plan and found the labor hours and skill mix appropriate and reasonable to facilitate successful completion of the task order, as evidenced by the TOM's signature on the partnered task order plan as well as the attached Technical Evaluation dated May 18, 2009.

Other Direct Costs (ODC's)

ASRC proposes an increase in ODC's of _____ for a revised Task Order Total of _____. The NASA TOM has reviewed ASRC's proposed ODC's and found them acceptable and reasonable to facilitate successful completion of the task order as evidenced by the attached Technical Evaluation.

Fee


The total fee is calculated in accordance with that negotiated at the time of contract award and established in contract clause B.2, Contract Value, Award Fee, and Incentive Fee.

Other Data

The Resource Management Office (RMO) has verified that funds in the amount of \$_____ are available for this effort. Should additional funds be needed they will be made available at a later date. In the event that the additional funds are not available, the scope of work will be reduced. The period of performance is from March 6, 2006 through October 31, 2009.

Summary

Based on the above, the Contracting Officer, fully relying upon the data submitted by the contractor, has determined that the proposed estimated increase in the cost and fee of \$_____ for this task order revision is fair and reasonable and finds it in the best interest of the Government to issue Task Order 00335 CY7 Rev C. As a result of this action the revised total Cost Plus Award/Incentive Fee for Task Order 00335 CY7 Rev C is _____.



Joyce C. McDowell
Contracting Officer



Date

Enclosures\
Government Negotiation Position
Technical Evaluation
Task Order Plan

TASK ORDER 335, CY7 Rev C

Government Position

	<u>CY4</u>	<u>CY5</u>		<u>CY6</u>		<u>CY7</u>		<u>CY8 Baseline</u>		<u>TOTAL</u>		
			RATE	HRS	COST	RATE	HRS	COST	RATE	HRS	COST	
Direct Labor												
Director												
Electrical Engineer II												
Electrical Engineer IV												
Electrical Engineer V												
Electrical Tech II												
Electrical Tech III												
Engineer II												
Engineer III												
Engineer IV												
Engineer V												
Engineering Aide I												
Engineering Aide III												
Engineering Designer												
Engineering Designer II												
Engineering Designer III												
Engineering Designer IV												
Manager												
Mechanical Engineer II												
Mechanical Engineer III												
Mechanical Engineer IV												
Mechanical Engineer V												
Mechanical Technician II												
Mechanical Technician III												
Mechanical Technician IV												
Pneumatic Systems Mechanic												
Principal Investigator												
Project Manager III												
Project Manager IV												
Sr. Project Manager												
Supervisor												
Technical Editor												
Telecommunications Engineer IV												
Total ASRC Labor												
Total Subcontract Labor												
M&A												
Total Labor												
Other Direct Costs												
Subtotal												
Subcontract G&A												
ODC G&A												
Subtotal G&A												
Total Estimated Cost												
Adjusted Target Cost (less ODC)												
Award Fee												
Incentive Fee												
Total Est Cost & Fee	\$841,487	\$8,359,757			\$11,027,481			\$8,086,178			\$225,000	\$24,648,913

NAS10-03006: USTDC TECHNICAL EVALUATION FORM

(Use of this form is mandatory for all Task Order Plan changes)

WHEN A BASIS OF DETERMINATION BLOCK IS CHECKED, FILL INS ARE REQUIRED.

PROJECT TITLE LETF Constellation Program Support	Task Order No.: 335	
Technical Evaluator's Statement: I have reviewed the referenced Task Order Plan to confirm the Contractor's understanding of the scope of work and to ascertain the reasonableness of the kinds and quantities of resources proposed to accomplish that work. My findings and the rationale are provided below.	Revision: C	Task Order Plan Revision: C
1. JOINT DEVELOPMENT OF TECHNICAL REQUIREMENTS		
Prior to meeting with the contractor to develop the detailed technical requirements of this task, the NASA Task Order Manager (TOM) estimated the total cost of the work to be: <u>AN ADDITIONAL \$550K for CY7</u>		
On <u>MAY 10th, 2009</u> NASA and the contractor met to jointly develop the technical requirements of this task order plan.		
Discussion with the contractor during the technical requirement definition meeting(s) and application of the rates required by the basic contract, resulted in a total estimated cost of: <u>AN ADDITIONAL \$526K for CY7</u>		
Differences (if any) between the original Government estimate and the results of the technical requirement definition meeting is due to the following general factors:		
<u>INSIGNIFICANT VARIANCE BETWEEN THE GOV ESTIMATE AND CONTRACTOR ESTIMATE. THIS A DEVELOPMENT PROJECT AND NASA IS INVOLVED IN ALL ACTIVITIES, INCLUDING DETAILED COST DEVELOPMENT ON AN ONGOING BASIS.</u>		
2. ADEQUACY OF THE CONTRACTOR'S UNDERSTANDING OF THE STATEMENT OF WORK (SOW):		
STATEMENT OF WORK: The contractor's description of the work to be performed, methods of accomplishment, schedules and/or plan of execution <input checked="" type="checkbox"/> are () are not consistent with the intent of the Task Order and reflect a reasonable basis to proceed.		
3. ADEQUACY OF LABOR RESOURCE REQUIREMENTS:		
ASSESSMENT OF LABOR HOURS: The kinds, quantities, and distribution of labor hours proposed (including those of subcontractors, university affiliates, and/or the use of overtime, if proposed) <input checked="" type="checkbox"/> are () are not considered appropriate and reasonable to accomplish the scope of work. The basis for this determination is:		
<input checked="" type="checkbox"/> Previous experience with task order number <u>335</u> from CY <u>6</u> . The hours and skill mix are consistent with the actuals experienced on this successfully completed task.		
<input type="checkbox"/> Previous experience with the work performed on contract number _____. The work successfully performed on this past contract was similar in nature and scope to the work being considered on this task.		
NAS10-03006 USTDC Technical Evaluation Form 12/10/2008 Page 1 of 3		

NAS10-03006: USTDC TECHNICAL EVALUATION FORM

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WHEN A BASIS OF DETERMINATION BLOCK IS CHECKED, FILL INS ARE REQUIRED.☒ Engineering judgment gained from 20 years working on similar projects.☐ Government engineering breakdown/analysis of all elements. (Attached)☐ Detailed comparison with independent Government estimate. (Attached. Include an explanation of Inconsistencies between the Government Estimate and the final Task Order Plan)☐ Other basis:**4. ASSESSMENT OF OTHER DIRECT COSTS (ODC):****a. MATERIAL and OTHER SUBCONTRACT COST:**

The kinds and quantities of materials, equipment, and/or other subcontracts (including consultants, temporary services, etc.) ☒ are () are not () N/A considered appropriate and reasonable to accomplish the scope of work. The basis for this determination is:

☐ Previous experience with task order number _____ from CY____. The proposed ODC's are consistent with the actuals experienced on this successfully completed task.☐ Previous experience with the work performed on contract number _____. The work successfully performed on this past contract was similar in nature and scope the work being considered on this task.☒ Engineering judgment gained from 20 years working on similar projects.☐ Government engineering breakdown/analysis of all elements. (Attached)☐ Detailed comparison with independent Government estimate. (Attached. Include an explanation of Inconsistencies between the Government Estimate and the final Task Order Plan)☐ Other basis:**b. TRAVEL:**

The contractor's proposed use of travel ☒ is () is not () N/A considered appropriate regarding the number and nature of trips and travelers, destinations and duration of stays. The basis for this determination is:

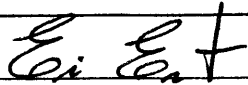
☒ Previous experience with task order number 335 from CY06. The proposed travel is consistent with the actuals experienced on this successfully completed task.☐ Previous experience with the work performed on contract number _____. The work successfully performed on this past contract was similar in nature and scope the work being considered on this task.☐ Engineering judgment gained from ____ years working on similar projects.☐ Government engineering breakdown/analysis of all elements. (Attached)☐ Detailed comparison with independent Government estimate. (Attached. Include an explanation of Inconsistencies between the Government Estimate and the final Task Order Plan)☐ Other basis:

NAS10-03006: USTDC TECHNICAL EVALUATION FORM

(Use of this form is mandatory for all Task Order Plan changes)

WHEN A BASIS OF DETERMINATION BLOCK IS CHECKED, FILL INS ARE REQUIRED.**5. ANY OTHER COMMENTS (SCHEDULES, ETC):**NASA Task Order Manager: Eric Ernst

Signed:



Date:

5/12/09